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Degree Programme in Industrial Engineering and Management

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Strategizing for Digital Transformation: A Case Study of Digital Transformation Process in the Construction Industry

Master's Thesis
Helsinki, 17.8.2017

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Aalto-yliopisto
Perustieteiden
korkeakoulu

Diplomityön tiivistelmä

Tekijä: Timo Mäkinen

Työn nimi: Strategia digitaalisen transformaation tukena: tapaustutkimus digitaalisesta muutosprosessista rakennusteollisuudessa

Koulutusohjelma: Tuotantotalous

Valvoja: Risto Rajala (KTT)

Pää tai sivuaine/koodi: Strategy and Venturing, SCI3050

Työn ohjaaja: Jaakko Siltaloppi (TkT)

Päivämäärä 17.8.2017 **Sivumäärä** 103 + 7 **Kieli:** Englanti

Tiivistelmä

Nykyinen nopeatahtinen teknologian kehitys muuttaa yritysten toimintaympäristöä toimialasta riippumatta. Yritykset perinteisimpiä toimialoja myöten pyrkivät hyödyntämään aktiivisesti pilvianalytiikkaa, ihmisten digitaalista yhteydenpitoa, sensoriteknologiaa sekä älylaitteita. Tämä digitaalinen transformaatio pakottaa yritykset uudistamaan paitsi teknologisia ratkaisuja, myös perimmäisiä arvonluonnin ja liiketoiminnan malleja.

Fundamentaalinen muutos kohti digitaalisia alustapohjaisia liiketoimintamalleja ei aina ole helposti toteutettavissa, sillä siirtymässä on useita haasteita jotka ovat usein täysin uusia muutosta tavoittelevalle organisaatiolle. Tämä tutkimus pyrkii ymmärtämään digitaalista transformaatiota pohjimmiltaan perinteisellä toimialalla kvalitatiivisen tapaustutkimuksen keinoin. Erityisinä painopisteinä ovat digitaalista muutosta ajavien organisaatioiden kohtaamat haasteet sekä digitaalisen transformaation edistämiseen sekä siitä hyötymiseen tähtäävä digitaalinen strategia.

Tämän tutkimuksen kaksi pääasiallista teoreettista kontribuutiota ovat i) uusi viitekehys joka kuvaa digitaalisen transformaation haasteita, sekä ii) yksityiskohtainen kuvaus digitaalisesta muutosprosessista sisältäen muutosprosessin eri vaiheissa hyödynnetyt johdon työkalut. Sekä viitekehys että muutosprosessin kuvaus tarjoavat lisäksi konkreettisen työkalun muutosprosessin systemaattiseen arviointiin ja tehokkaaseen suunnitteluun.

Tutkimuksen empiirinen näyttö tukee ajatusta siitä, että nykyinen digitaalisen strategian kirjallisuus saattaa painottaa liiaksi yksittäisiä transformatiivisia digitaalisia aloitteita ja väheksyä perinteisen liiketoiminnan prosessien digitoinnin merkitystä, sillä digitoidut liiketoimintaprosessit tarjoavat vahvan pohjan digitaaliselle innovoinnille. Lisäksi nykyinen kirjallisuus keskittyy vahvasti sisäisiin muutosta hidastaviin haasteisiin, kun taas tutkimuksen empiirinen todistusaineisto osoittaa, että suurimmat ja haastavimmat muutosta hidastavat tekijät liittyvät usein yrityksen muutosvastaiseen institutionaaliseen ympäristöön.

Avainsanat: Digitaalinen transformaatio, Digitaalinen strategia, Digitaalisen transformaation haasteet, Digitaalinen muutosprosessi, Sisäinen yrittäjyys

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Abstract of master's thesis

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Master's programme: Industrial Engineering and Management

Thesis supervisor: Risto Rajala (D.Sc)

Major or Minor/Code: Strategy and Venturing, SCI3050

Department: Industrial Engineering and Management

Thesis advisor: Jaakko Siltaloppi (D.Sc)

Date 17.8.2017 **Number of pages** 103 + 7 **Language:** English

Abstract

The current fast-paced technological development is revolutionizing the operating environment of corporations in all industries. Organizations even in traditional industries are experimenting with cloud analytics, digital connectivity of people, sensor technology and smart devices. This digital transformation forces companies to rethink not only the technologies utilized, but also their core models for value creation and capture.

This transformation towards digital, platform-based business models might not be easy to accomplish, as the shift presents several challenges that are often completely new to the corporations. This study aims to understand the process of digital transformation in a traditional industry setting through a qualitative single case study. Specific focus is set on the challenges that the organization facilitating digital transformation is likely to face, and the digital strategy that can be utilized to advance and benefit from digital transformation.

The two theoretical contributions of this study are i) the new framework concerning digital transformation challenges and ii) the detailed description of a digital transformation process and the different managerial tools utilized in different phases of the transformation process. These contributions also have managerial relevance as they can be utilized to evaluate and plan a digital transformation process.

The empirical evidence of this study proposes that the existing digital strategy literature might focus too strongly on individual transformative digital initiatives and overlook the importance of digitizing the traditional business processes in order to create a solid foundation for digital innovating. In addition, the existing literature focuses strongly on internal transformation challenge, whereas the most important and difficult challenges in the empirical case considered the rigid institutional environment of the organization.

Keywords: Digital transformation, Digital strategy, Digital transformation challenges, Digital transformation process, Intrapreneurship

Contents

Introduction

The accelerating technological development together with growing global competition and faster product and business model innovation cycles dramatically change the operating environment of corporations as well as consumers. This is especially true for digital technologies, and companies in practically all industries have already experimented or are exploring ways to utilize new digital technologies and digital innovation. Novel digital technologies such as analytics, connectivity of people, sensor technology and smart devices are experimented across all industries. The transformation does not only affect company products and service offerings but complete business ecosystems by affecting all aspects from customer interfaces and value creation models to products and business models.

This so-called *Digital transformation* is becoming a more and more central topic in both management literature as well as companies' business strategies (Patel & McCarthy, 2000; Andal-Action et al., 2003). However, despite the emphasis given to it, most of the companies especially in the more traditional industries lack a coherent and comprehensive approach to digital transformation. Even though they often invest in digital and information technology capabilities, they fail to see beyond the technology itself, resulting in incremental development rather than fundamental transformation utilizing digitalization to its full potential.

At the same time, these traditional industries are transformed by completely new actors who do not attach themselves to existing value chains. These actors use digital technologies to implement completely new business models. This transformation started within industries offering digital products such as music & entertainment, media, software etc., but is quickly spreading to most of the traditional industries with primarily physical products. The most well-known examples are Uber implementing a completely new business model in personal transportation industry and Airbnb changing the rules of accommodation industry.

Digital transformation presents a new type of challenge to established organizations in traditional industries: they need to reinvent and constantly re-evaluate not only their position in the value chain, but the value creation process as whole. This requires a comprehensive digital strategy where the outcome is not a certain product or business model but rather the capability to cope in the new, transforming business environment. The purpose of the present study is to improve the current understanding on *what are the most common digital transformation challenges in a traditional industry setting and how an existing company can create a digital transformation strategy that allows them to pursue digital transformation.* The problem is approached through a single-case empirical study focusing on digital transformation process of a mid-sized Finnish construction company.

The thesis processes the subject by first offering background and motivation for the study as well as the formulated research questions. The second section presents a literature review focusing on digital transformation, digital strategy and intrapreneurship. The third section explains the research methodology and process, whereas the fourth section introduces the case company and describes its current digital strategy. The fifth section, the empirical evidence is presented and an analysis focusing on digital transformation challenges and digital transformation process is conducted and reported. The last section discusses the conclusions that can be drawn from the empirical evidence and compares them to existing digital transformation literature. In addition, the managerial and theoretical relevance ae discussed and propositions for future research streams are presented.

Background and motivation for the research

The constant, fast-paced development has not gone unnoticed in management literature or in companies operating in industries affected by digital transformation. Westerman et al. (2011) conducted a research with 157 respondents (executives in

large, traditional companies) and they perceived the current pace of business to be much faster than five years ago and expected the pace to continue increasing, leading to pressures towards fundamental transformation. Accordingly, Fitzgerald et al. (2013) found that a stunning 78% of their 1 557 respondents perceived that achieving successful digital transformation will be critical to their organizations within two years.

However, the transformational nature of the development may be difficult to achieve. Many organizations see digital technologies as an incremental addition affecting for example only products or customer interfaces, but the underlying business models and value creation logics of established industries remain. This is especially true in industries with products that cannot be completely digitized (Hanelt et al., 2015).

The result is a situation where companies routinely invest in technological development and achieve incremental progression, failing to introduce completely new ways of doing business (Fitzgerald et al., 2013). This lack of focus and failure to utilize digital transformation to its full potential is a management challenge rather than technology one (Westerman et al., 2011) and solving it requires a better understanding of digital business strategies (Mithas et al., 2013). Matt et al. (2015) state that companies need established management and governance practices (i.e. digital strategies) in order to coordinate and prioritize a fundamental digital transformation.

Digital transformation is, however, such a novel topic that management literature cannot really offer any direct best practices or roadmaps on how to cope with digital transformation. In addition, digital transformation manifests uniquely in each industry, blurs the boundaries of industries and introduces completely new types of business opportunities as well as challenges and competition in each industry. These shifting boundaries together with shortening life cycles of products, business models etc. emphasize the capability to constantly innovate and transform rather

than the exact positioning of the company in the current business ecosystem. In this thesis, this capability to innovate and constantly re-evaluate the chosen business models and services is considered to be the key to utilize digitalization to its full extent and a target of a successful digital strategy.

Digital transformation and pursuing a digital strategy often forces established companies to pursue innovations and businesses that are not closely related to the company's existing businesses and/or don't share the same resources and capability requirements (Hanelt et al., 2015; Matt et al., 2015; Lenka et al., 2015). This kind of innovation activities are often most efficiently pursued by intrapreneurs (i.e. people within the organization pursuing entrepreneurial activities and goals) (e.g. Burgelman et al., 1983; Kuratko et al., 1990; Hornsby et al., 2002; Antocic & Hisrich, 2001; Antocic & Hisrich, 2003 and Benitez et al., 2010). Intrapreneurship is a significant source of innovation in established organizations (Benitez et al., 2010) and especially important in creating completely new technological innovations and firm renewal (Menzel et al., 2007). This type of internal, intrapreneur-driven innovating in modern organizations often relies on fluent knowledge-sharing, innovative culture, digital capabilities, technological excellence and strong organizational vision (Benitez et al., 2010; Christensen et al., 2005).

Entering the digital era of business forces traditional organizations to focus on new kind of organizational support and resource availability for intrapreneurial innovation activity, and emphasizing intrapreneurship could become a key component of a successful digital strategy. This interaction between digital strategy and intrapreneurship is little researched in management literature, and one key focus of this thesis is to study both the traditional and more novel enablers of intrapreneurship in the context of digital transformation initiatives and digital strategy.

Research goals and questions

The described background motivates the goal of the thesis as developing new knowledge on the development and implementation of digital strategy in a traditional industry setting. Digital transformation is seen as an important topic throughout different industries, but especially companies in traditional business environments often lack the capabilities to utilize the opportunities of digital transformation as they often lack a coherent and comprehensive digital strategy.

The study explores the phenomenon through extensive literature review by first describing the digital transformation as described by management literature. This is then continued by examining the implications of this transformation to company level strategy (i.e. digital strategy). Emphasis of the review is put on transformative innovations beyond product and process enhancement, namely value creation model and business model innovation. After reviewing digital transformation literature, intrapreneurship is examined as one potential source of these transformative innovations.

Digital transformation in traditional organizations is often seen as a transformation affecting technologies, products and processes rather than a fundamental strategic change, requiring constant business development and repositioning in the business environment. However, as the key to digital strategy is re-envisioning and changing how the company operates, the key challenges are managerial, not technological (Westerman et al., 2011 and Fitzgerald et al., 2013). The objective of this thesis is formulated to the main research question as follows:

How can an organization in the construction industry create and implement a strategy to support its digital transformation?

Based on the main research question, two supporting research questions are formulated. These questions clarify the challenges that digital transformation

presents and the means that an organization can manage digital transformation process and cope with those challenges:

RQ1: What kind of challenges does digital transformation impose on strategizing in the construction industry?

RQ2: How can a construction company efficiently organize, support and enable digital transformation process?

The first research question focuses on how digital transformation affects strategy formulation and implementation as well as innovation activities, especially in terms of transformative innovations in business logics. The second research question examines the different challenges of digital transformation process. The third research question examines ways to drive the digital transformation process, explores enabling and organizing of strategic digital initiatives that drive digital transformation and formulates the transformation process in the case context.

Research design

This thesis adopts a qualitative single-case study as the central research method. The qualitative data is collected through semi-structured interviews within one organization acting in a relatively traditional business environment. The structure of the interviews themselves was not rigid, but the interviews were rather free discussions following loosely a structure that was formulated before each interview.

The focus of the study is in the case company context. The company approach to digital transformation is evaluated and their digital strategy analyzed. This approach is then compared to the findings from the literature review, and ideally, some managerial implications can be presented in order to improve the digital transformation process of the case company. As digital transformation often has similar characteristics in different settings, some lessons and frameworks can be applied to other companies facing similar situations. For example, the

characteristics of a good digital strategy and enablers of intrapreneurship may be generalizable between situations with similar characteristics.

The case company, Fira Group, was chosen as it was considered to be highly suitable for the research setting. Fira Group is a mid-sized organization operating in Finnish construction sector that can be perceived as a rather traditional industry. The construction sector is an industry that is being changed through digital transformation, but the products of the industry cannot be completely digitized, which is the case with several previous studies describing digital transformation of industries (Hanelt et al., 2015). The fact that the phenomenon is rather unexplored in such an organizational setting offers further arguments for the selected research design.

Fira Group has recently started to set strategic significance on digital transformation and is in the middle of the process of formulating and implementing a coherent and comprehensive digital strategy. This strategic emphasis shows in several strategic initiatives started by Fira Group, and the insights extracted from this ongoing strategy development process may add value to management literature on the subject and offer managerial suggestions to organizations facilitating their digital strategy development.

Literature review

The recent development of information and communication technology diminishes the role of tangible assets in value creation process and enhances the role of gathering and using digital content (Kowalkowski et al., 2013). Emergent digital technology trends such as cloud computing, social media, mobile technology and big data induce fast changes in many organizations spanning even the sectors where the products cannot be digitized (Hanelt et al,. 2015; Setia et al., 2013). The industrial companies in modern digital, networked environments need to rely on the newly needed ability to utilize digitalization in complex and dynamic customer interactions (Lerch & Gotsch, 2015; Parida et al., 2015). However, digitalization of processes as well as business models is not an inevitable path dictated by technological breakthroughs: Kane et al., (2015a) state that digital strategy rather than technological developments create digital transformation. As an outcome of this digitalization-driven transformation, companies are creating more and more digital products complementing the existing traditional products (Westerman et al, 2011) but also creating completely new ways of doing business (Fitzgerald et al, 2013).

This section considers the concept of digital transformation, focusing on its definition and influence on value creation and novel business models as described by modern literature. Digital transformation challenges are also considered and a framework aiming to categorize these challenges is presented. The effects of digital transformation to business strategies are explored and the concept of digital strategy is introduced. Last, the concept of intrapreneurship is introduced as a possible way to implement and intensify digital transformation in organizations that are operating in environments that are more “traditional” and where the product that the customer receives is not purely digital.

Digital Transformation

Digital transformation is a concept introduced in 2000 by Patel and McCarthy. Since then the exact definition of the term has varied, with earlier authors such as Patel and McCarthy (2000) often focusing on areas such as e-commerce and digital marketing or for example digital literacy (Lanshear and Knobel, 2008). However, the recent authors often emphasize the renewal of complete business models and value creation logics across entire industries as the core of digital transformation (Westerman et al., 2011; Fitzgerald et al., 2013 and Kane et al., 2015a). Digital transformation also has holistic definitions, the most cited and well-known one probably being the one introduced by Kaplan et al. (2010) as follows: "*digital transformation can be understood as the changes that digital technology causes or influences in all aspects of human life.*"

This evolution of the definition is understandable, as the focus of digitalization and global connectivity has shifted as technology has developed and the possible applications in different industries have increased (Berman & Bell, 2011). As the focus of digital applications has evolved from digital products on specific industries (e.g. music and entertainment) in the 1990s to complete transformation of business models in the 2010s (Berman & Bell, 2011), the definition of digital transformation has evolved similarly.

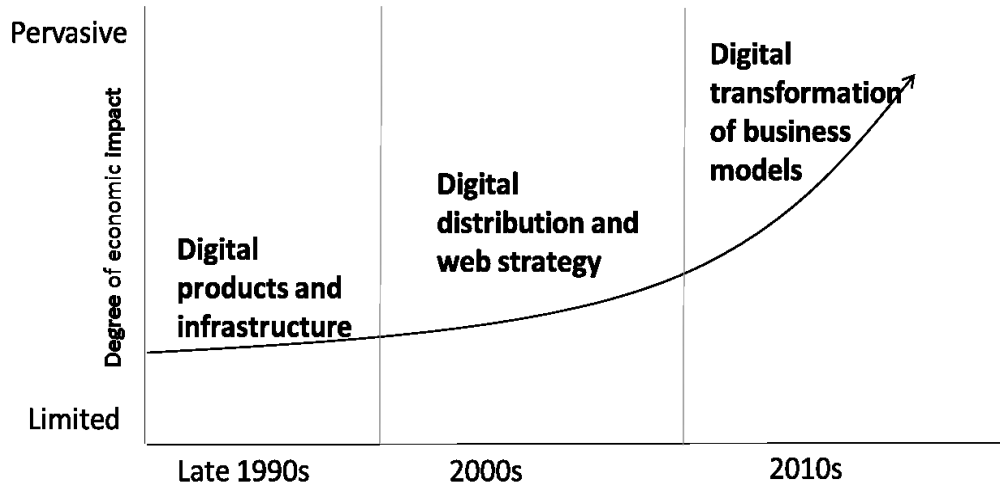

Figure 1: The evolution of digital transformation (Berman & Bell, 2011)

Fitzgerald et al. (2013) state, that there are three areas, where novel digital technologies can provide advantages: better customer experience, better-streamlined operations and new business models. This thesis focuses on digital strategies and the creation of digitalization-enabled new business models in an industry with essentially a non-digital product, and thus an according definition of digital transformation is used. The thesis defines digital transformation according to Fitzgerald et al., (2013) as *"the use of new digital technologies to enable major business improvements such as enhancing customer experience, streamlining operations or creating new business models."* A highly similar definition for digital transformation was introduced by Westerman et al. (2011), who define digital transformation as *"the use of technology to radically improve performance or reach of enterprises".* These definitions are similar in that they emphasize the creation of new business models and radical improvement of the reach of organization's activities, but the former definition was chosen as it was considered more self-explanatory and holistic.

Reshaping value creation – From product pipelines to platforms for business

The use of new digital technologies and digital business ecosystems often imply fundamental changes in value creation models (Matt et al., 2015) that can result in completely new interorganizational business architectures (El Sawy & Pereira, 2012). The industry-wide digital transformation often affects the organizations' value chain in a way that deviates fundamentally from the value chain logic of the classical core business (Matt et al., 2015).

Pipeline businesses rely on the traditional value-chain model, where value is created through a linear series of activities within the organization's borders (Van Alstyne et al., 2016). The core premise of this value creation model is that higher sales volumes enable the lower average cost of doing business, and the critical assets often focus on increasing operational efficiency (Van Alstyne et al., 2016). This product-centric perspective, where the product is proprietary and strictly under the control of the manufacturing company focuses on competitive advantage emerging from the supply-side economies of scale (El Sawy & Pereira, 2012; Van Alstyne et al., 2016).

In the platform-based value creation model, proprietary products are replaced with industry platforms, defined as "intermediaries that connect two or more distinct groups of users and enable their direct interaction" (Zhu & Furr, 2016). These platforms act as the foundation technology for broader, independent business ecosystems (El Sawy and Pereira, 2012). Platforms serving multi-sided markets as such are nothing new. Malls connecting customers to several retailers and credit cards offering payment solutions to buyers and sellers have existed for a long time. What is changing, however, is that technological development is transforming several traditional business ecosystems, as novel technologies allow the adoption of platform-based value creation in more and more industries. Modern digital technologies enable increasing the participation of customers and allow them to

become a part of the value creation process as the co-creators of value (Hanelt et al, 2015).

The development of digital technologies simplifies and decreases the development costs of platforms with high scalability (Van Alstyne et al., 2016), and as a result firms and groups of firms establish digital platforms to combine new technologies and assets outside the scope of any individual organization. New digital technologies allow nearly frictionless participation to platforms, and as a result, several important assets are no longer within the organizational boundaries, but rather created by interactions of the platform participants and in the resources that these connected participants contribute to the platform (Van Alstyne et al., 2016; Gawer and Cusumano, 2008). In platform ecosystems, the supply-side economies of scale lose significance and the so-called network effects gain importance. The larger and the more developed the network is, the more it creates value to the participants as the supply and demand match better and economies of scale are increased (Eisenmann et al., 2006, Van Alstyne et al., 2016). This new allocation of critical assets as well as the new model of value creation often requires a creating and communicating a new value proposition to the network and a new business model to capture value and monetize these novel customer value propositions (Berman & Bell, 2011).

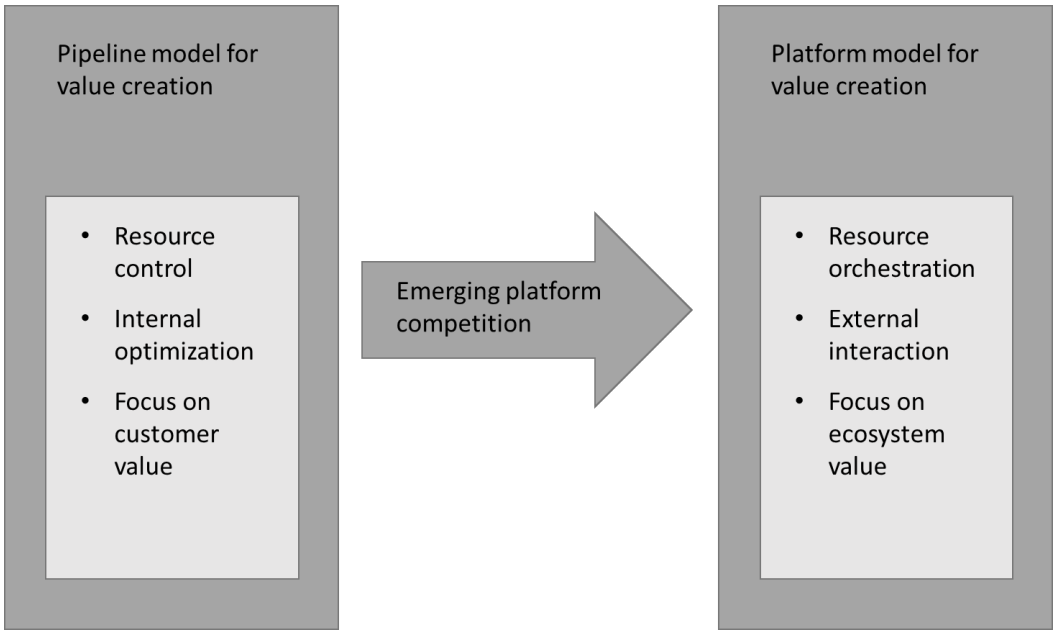

Figure 2: From pipeline value creation to platforms – Transformation of value creation logics (applied from Van Alstyne et al., 2016)

New digital-driven business models

As industries undergo digital transformation and consider the new value creation models and opportunities digital transformation presents, old business models are often not applicable to the new business environments and new business models are needed (Berman & Bell, 2011). In order to consistently discuss this transformation of business models, a definition as well as a coherent classification of business models are needed. This thesis adopts the definition introduced by Zott & Amit (2008) as *"A structural template of how a focal firm transacts with customers, partners and vendors; that is, how it chooses to connect with factor and product markets."* Similarly, a classification introduced by Libert et al. (2016) is adopted. Libert et al. (2016) classify the operation of firms into four business model categories: asset builder, service provider, technology creator and network orchestrator. These business models differentiate fundamentally in terms of value delivery method as well as the fundamental object of the organization.

Table 1: The business model categorization (Applied from Libert et al., 2016)

Business model	Value delivery method	Core of operations	Example companies
Asset builder	**Through use of physical goods**	**Making, marketing, distributing and selling physical goods**	**Ford, Walmart, Exxon, Boeing**
Service provider	Through skilled people	Hiring and developing workers who provide services to customers	Accenture, Humana, JPMorgan Chase
Technology creator	**Through ideas and new technologies**	**Developing and selling intellectual property**	**Microsoft, Oracle, Pfizer**
Network orchestrator	Through connectivity	Creating a platform where praticipants interact with other members of network	eBay, Uber, Visa, TripAdvisor

El Sawy and Pereira (2012) state that the emerging digital technologies create connected digital ecosystems comprising of existing and new actors in the industry working with new structures and rules concerning collaboration, value creation and the products of the industry themselves. This new digital business ecosystem and the new digital operating environments resulting in the need for digital business models (El Sawy & Pereira, 2012; Hanelt et al., 2015).

To succeed in these new business environments, organizations have to identify, activate and partner with the networks that exist in and around the organization and position themselves correctly to create value for the network and capture value (Libert et al., 2016). This digital transformation of business ecosystems forces the organizations to transform their business models to such that focus on networks of people and organizations even in the more traditional, dominantly asset-focused industries (Libert et al., 2016; El Sawy & Pereira, 2012). For example automobile manufacturers traditionally relying on internal competencies in engineering, design and electronics, have started to shift their business models towards more differentiated, service oriented and integrated solutions relying on the value created by the business ecosystem (Hanelt et al., 2015)

It is clear that innovation in digital technologies has a clear effect on business model change and the topic of digital business models (i.e. business models where digital technologies change how the value chain works and revenues generated) is of major

importance (Hanelt et al., 2015). Libert et al. (2016) have shown that organizations whose business model is classified as network orchestrator on average grow faster, generate higher profit margins, are more asset-efficient and have remarkably higher enterprise value compared to revenue. However, digital business model transformation is also elusive: Fitzgerald et al. (2013) conducted a survey that garnered responses from 1 559 respondents from a wide array of industries, and only 7% of them felt that their company's digital initiatives were creating new businesses, and 15% felt that digital technology initiatives were creating new business models.

Insights on transformation of business models are hard to transfer between industries (Hanelt et al., 2015) and even within an industry the market conditions and business environment may evolve rapidly and radically (Kreutzer, 2014). Kreutzer (2014) states that in digital, fast-changing environments the key organizational capability is actually adaptability, and especially "reactive" adaptability that focuses on recognizing and realizing new business opportunities. In such an environment, the organizations with the most cohesive strategy to implement digital layers to their physical components of operations are the ones that can successfully transform their business models (Berman, 2012). This implies that the managerial focus should not be in individual new business models or business opportunities, but rather in creating a coherent digital strategy that takes into account both new digital business models as well as the new value propositions discussed earlier. According to a similar line of thought, Westerman et al. (2011) state that a successful digital transformation comes from transforming your organization's strategy to utilize the possibilities of digital technologies rather than simply implementing individual new technologies.

Digital strategy

What differentiates digital leaders from other actors is not technological excellence, but rather a good digital strategy and a culture and leadership that excel in driving

the digital transformation (Kane et al., 2015a). Kane et al. (2015a) also found that lack of coherent digital strategy and competing priorities are the largest obstacles for a successful digital transformation. In addition to a coherent and well-communicated digital strategy, a controlled digital transformation requires a significant investment in building the required organizational capabilities to support the digitalization initiatives within the company (Lenka et al., 2017).

In contrast to the traditional strategies building on organizational capabilities, a digital strategy should describe a future vision, rethink business and commerce and work the steps backwards in terms of capabilities required etc. (Kane et al., 2015a). This kind of focus on the "how" to transform rather than the actual content of the change is common for successful digital transformation (Westerman et al., 2011). Most of modern strategy literature agrees that a successful digital transformation is not a product of implementation of new technologies, but rather from creating such a digital strategy that allows the organization to take advantage of the possibilities that novel digital technologies provide (Westerman et al., 2011; Kane et al., 2015a; Matt et al., 2015). The idea itself is not especially new, as for example Carr (2003) has stated that novel technologies will not offer a sustainable competitive advantage unless they are proprietary. Conversely, a lack of coherent digital strategy is the largest barrier to a successful digital transformation (Kane et al., 2015a).

In an environment where business models have shorter life cycles and the operating models need to be constantly reconsidered, a consistent digital strategy supported by the management is crucial (Kane et al., 2015a). Leaders of the industry need to stay ahead of the curve for the evolving business model (Kane et al., 2015a) and constantly re-envision customer experience, operational processes and new business models (Westerman et al., 2011). Thus, the cornerstone of a good digital strategy is not a roadmap to a desired future state or a list of best organizational practices. A good digital strategy has to focus on promoting the constant development of the organization and its business environment in terms of

innovation on the products and operations as well as business and value creation models.

Westerman et al. (2011) claim that strategy-driven digital transformation is driven from the top rather than occurring bottom up. The challenge of completely transforming an industry is mostly tackled with strong, coherent and comprehensive vision central to a good digital strategy. The organizational vision communicates the value of digital innovation within the organization as well as to external networks. This is supported by strategy literature promoting the significance of top-management vision as the driver of digital transformation and the cornerstone of most of the successful digital strategies (Fitzgerald et al., 2013; Kane et al., 2015a).

Fitzgerald et al. (2013) discovered that in companies where the top management had shared their vision regarding digital transformation, 93% of the employees agreed on the importance of the subject. According to Westerman et al. (2011), the transformative vision together with engagement, governance and KPIs allows the people throughout the organization to identify the opportunities that meet the vision and aim to realize them. An efficient method to communicate the organizational digital vision is storytelling both within and across organizational borders; digital stories increases employee buy-in and organizational acceptance as well as create pride in the company (Kane et al., 2015a).

Coherent perception of digital vision within the organization also increases collaborative activities within the working environment, as the employees share a common goal as well as a feel of importance in the subject. For example, Kane et al. (2015a) consider these collaborative interactions to be highly beneficial for companies aiming to benefit from digital transformation as the cross-functional and cross-field collaboration increases the occurrence of transformational innovations. In addition to organizational vision and encouraged collaboration, a digital strategy should also aim to recognize the talents, skills and capabilities the organization is lacking, and aim to either externally recruit (Westerman et al., 2011) or internally

develop (Kane et al., 2015b) these capabilities. The third part of ensuring organizational capabilities a digital strategy should consider is reducing the risk of losing relevant talent (Kane et al., 2015a).

Creating a foundation for digital initiatives is not sufficient in itself, as a digital strategy should also observe and evaluate these digital development initiatives and test their impacts consistently (Matt et al., 2015). In addition to defining these procedural aspects, the responsibilities in planning and deploying digital transformation projects should be established (Matt et al., 2015). This cross-functional and cross-division coordination of strategic digital initiatives ensures that the digital initiatives receive the organizational support that they require in order to drive the transformative change (Westerman et al., 2015; Matt et al., 2015). The digital strategy should also coordinate the relationship between new digital businesses and traditional business units, as they may have synergies that require coordination, but they may also have direct conflicts of interests as the new digital businesses threaten the traditional businesses (Westerman et al., 2011).

After testing and evaluating the digital initiatives, the digital strategy should ensure that those digital initiatives considered potential receive the resources they need, in terms of time and money allocated to the digital initiatives (Westerman et al., 2011; Fitzgerald et al., 2013). In addition, the digital strategy should consider ensuring sufficient IT and information infrastructure, as they affect the organizational capability to both create and capture value from the digital initiatives (Drnevic & Croson, 2013). According to Drnevic and Croson (2013) this investment in IT infrastructure is often overlooked, as the monetary returns can rarely be directly allocated to IT infrastructure and information resources.

Because of the need for continuous innovation and the pace of the new opportunities rising, the focus of digital strategy has to be developing a continuous process for digital innovation (Fitzgerald et al., 2013). In this constantly changing environment, the method of development is experimentation and response, rather than careful

prediction and planning (Downes & Mui, 1998). Rather than dictating what data and information sources to use and how, digital strategy and organizational culture has to champion the use of data and analytics in decision making (Kane et al., 2015a; see also Westerman et al., 2011, Reeves & Deimler, 2011 and Kreutzer, 2014). The key characteristic differences between traditional business strategies and digital business strategies as described in strategy literature are described in table 2.

	Traditional business strategy	Digital strategy	Authors
Focus	**Individual technologies, optimization of individual units**	**Focus beyond process paradigm, implications for products, services and business models as a whole**	**Matt et al., 2015; Van Alstyne et al., 2016**
Scope	Detailed content of the strategy	How to realize the organizational vision	Westerman et al., 2011; Fitzgerald et al., 2013
Objective	**Operational efficiency**	**Business transformation, re-envisioning customer experience, operations and business models**	**Westerman et al., 2011; Fitzgerald et al., 2013**
Time frame	Multi-year	Continuous	Downes & Mui, 1998; Kreutzer, 2014; Matt et al., 2015;
Source of innovation	**Talented individuals, capabilities within organization**	**Collaborative, cross-industry and cross-business unit efforts and knowledge sharing**	**Kane et al., 2015**
Business model cycle	Slow to medium	Fast	Matt et al., 2015, Westerman, 2011; Berman, 2012
Method	**Predict and plan**	**Experiment and respond**	**Downes & Mui, 1998**
Business model	Asset builder, Service provider	Technology creator, Network orchestrator	Libert et al., 2016
Competitive advantage	**Propietary assets**	**Ability to transform, adaptability**	**Kane et al., 2015; Kreutzer, 2014; Carr, 2003; Reeves & Deimler, 2011**

Table 2: The differences between traditional business strategies and digital business strategies

Digital transformation challenges

As the previously described extensive literature on digital transformation shows, both management literature and corporations often acknowledge the need for digital transformation and a coherent digital strategy. Despite this growing acknowledgement of the importance of digital transformation, several companies have difficulties in starting and implementing digital transformation, and especially in benefitting from this transformation (Fitzgerald et al., 2015; Westerman et al., 2011). One focal point of this thesis is to recognize and classify these challenges of digital transformation and evaluate how digital strategies described by management literature answer these challenges. This process is started by listing and categorizing the challenges recognized in digital transformation literature and creating a framework concerning digital transformation challenges.

The traditional literature on the subject of managing strategy and business transformation and the challenges that corporates face when managing transformation is extensive and thorough (e.g. Kotter, 1995; Beer & Nohria, 2000; Sirkin et al., 2005; Beer et al., 1990). Even though the challenges on managing digital transformation obviously have some overlap with general transformation management challenges, digital transformation can also be argued to have its own distinct characteristics, and thus this section of the literature review focuses only on challenges recognized by digital transformation literature. This literature is narrower due to the rather new nature of the subject, but several articles identify and classify managerial challenges for digital transformation.

The identified and explained challenges are categorized into **transformation challenges, innovation challenges** and **governance challenges.** The three identified categories are introduced as challenges phases, but it is noteworthy that these phases are not to be interpreted as phases of linear transformation from state

A to state B. Neither is the framework to be interpreted so that the organization would move from one state to another. The challenges remain rather constant and individual digital initiatives such as new products, value creation models and business model innovations need to overcome these challenges with appropriate managerial and organizational actions. In addition, the challenges do not appear in isolation, but rather they interact strongly in different organizations and situations and different transformative initiatives may have highly differing key challenges even within the same organization. Together these challenges and the execution of digital initiatives create a dynamic and strongly interactive environment and an iterative digital initiative execution process.

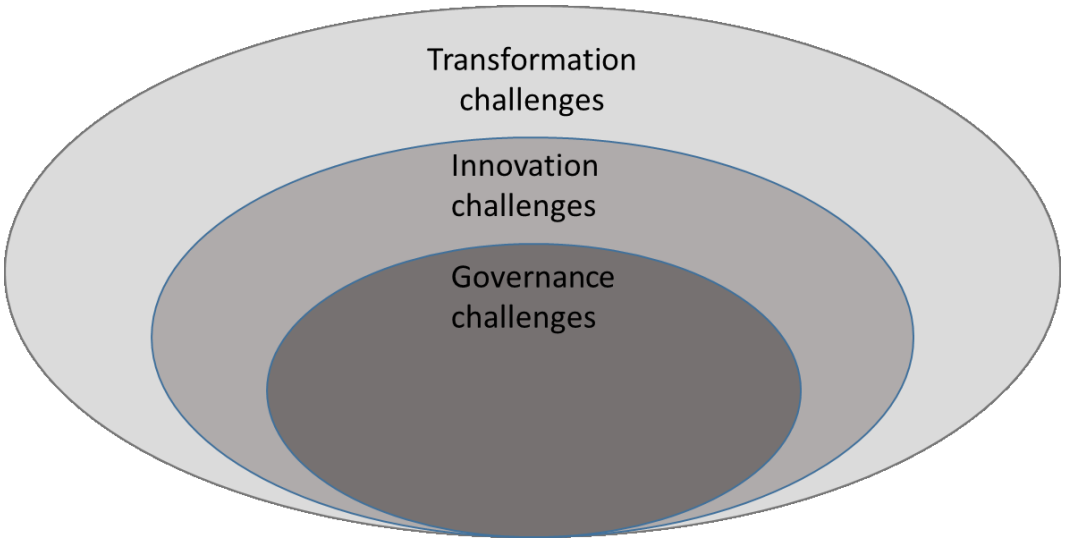

Figure 3: Digital transformation challenges

Transformation challenges

The first and maybe the most important transformation challenge is the **lack of vision** or incremental vision concerning digital transformation (Fitzgerald et al., 2013; Westerman et al., 2011; Kane et al., 2015a). Fitzgerald et al. (2013) state that each digital transformation starts with a vision from top management, and according to Westerman et al. (2011), as the most significant digital transformation benefits are yielded by truly transformative activities, the required vision has to be

radical and transformative rather than incremental. However, formulating and communicating a coherent vision is not always easy: Fitzgerald et al. (2013) found that in their study only roughly a third of the respondents felt that the senior management has shared a vision for digital transformation. Thus, in addition to creating a transformative vision, the challenge includes telling the right story to gain organizational traction for digital transformation.

Slightly related to the lack of vision, the **lack of impetus and urgency** was identified as a key challenge (Westerman et al., 2011; Fitzgerald et al., 2013). This challenge is especially affected by previously successful organizations, as the previous high performance both decreases awareness of digital opportunities and diminishes the motivation to pursue those (Westerman et al., 2011). This results in complacency that according to Fitzgerald et al. (2013) is the most common organizational barrier of digital transformation.

The third institutional challenge recognized in digital transformation literature is the **threatening of current power structures** (Fitzgerald et al., 2013). This challenge is often referred to as resistance to change due to internal politics and defending, for example, traditional technologies, systems and organizational structure and value creation chains (e.g., Fitzgerald et al., 2013; Westerman et al., 2011; Pagani et al., 2013). This study, however, acknowledges that digital transformation does not appear in isolation and expands the challenge to consider also institutional rigidity. Management literature on institutional change acknowledges that existing relationships between institutional actors in the business ecosystem and especially existing value chains of established actors create institutional resistance to change (e.g. Battilana et al., 2009; Weyland, 2008; Kingston & Caballero, 2009).

Innovation challenges

The second category, innovation challenges, considers mostly organizational factors decreasing digital innovation activity within the organization. As described in previous sections, digital transformation shortens the life cycles of products, processes and business models, and highlights the importance of constant innovation. Perhaps the most common challenge is the **lack of innovation culture** within the organization (Westerman et al., 2011; Kane et al., 2015a; Kane et al., 2015b; Fitzgerald et al., 2013). Kane et al. (2015b) argue that organizational culture is critically important in leveraging digital transformation, and that the relationship between organizational culture and digital technologies needs to be right in order to pursue digital opportunities. The innovation culture issues include several challenges such as risk aversion, competing organizational priorities and resistance to novel technologies and approaches (Westerman et al., 2011; Kane et al., 2015b; Fitzgerald et al., 2013).

In addition to innovation culture, the **lack of skills, capabilities and talent** is a much-cited digital transformation challenge (Westerman et al., 2011; Kane et al., 2015a; Kane et al., 2015b). One of the most common features in organizations pursuing digital opportunities successfully is that they have a digitally talented workforce (Kane et al., 2015a; Kane et al., 2015b). Digital development changes the capability requirements of workforce especially in traditional industries and thus investing significant resources in building the necessary capabilities to support digital transformation initiatives is needed (Lenka et al., 2017). This talented workforce may be externally hired (Westerman et al., 2011) or internally developed, but the lack of skills and capabilities is considered to clearly hindrance digital transformation initiatives and innovations (Kane et al., 2015b). Interesting in the subject of lack of talented workforce is that often the required skills and capabilities especially in managerial levels do not concern deep technical understanding of technologies (Kane et al., 2015a). The most vital capabilities

concern conceptualizing how digital transform impacts current businesses models and processes and the ability to identify transformative opportunities that can be pursued through digital initiatives (Kane et al., 2015a; Kane et al., 2015b).

Even though able individuals are required for efficient digital transformation, most of the new ideas arise through collaborative efforts (Kane et al., 2015a). **Siloing and lack of collaboration** is the third common challenge affecting innovation quantity and novelty (Fitzgerald et al., 2013; Kane et al., 2015a; Kane et al., 2015b). As the products and business models become more complex and combine for example different organizational functions and even reform business networks, efficient innovation can rarely be conducted in silos or by individuals, however talented they are, and the organizations succeeding in digital initiatives are likely to use cross-functional teams in developing and implementing those digital initiatives (Kane et al., 2015a).

The fourth factor affecting innovation activity and execution is **unclear business cases** (Westerman et al., 2011; Fitzgerald et al., 2013). Not all digital initiatives originally make sense to the company, and direct investment is easiest to reason when the returns are easy to see and quantify and occur in the near future (Westerman et al., 2011). According to Westerman et al. (2011) the business cases are often less clear for truly transformative initiatives, even though these initiatives are exactly what become foundational capabilities, enable creating novel digital products and platforms and drive the digital transformation.

Governance challenges

The third and last category of digital transformation challenges refers to challenges in governing the digital initiatives created by organizational innovation. These governance challenges include **coordination issues and unclear roles and responsibilities** (Westerman et al., 2011; Fitzgerald et al., 2013). These coordination issues may appear, for example, between business units that make

progress on their own areas, but fail to influence the necessary practices across other organizational units (Westerman et al., 2011). According to Westerman et al. (2011) lack of coordination of digital initiatives across for example marketing and product innovation or business model innovation and customer interfaces decreases the significance of individual innovations and initiatives. In addition, especially the more traditional industries and organizations face the challenge of coordinating between new and traditional business processes (Westerman et al., 2011).

In addition to coordination issues, **limited resources** for organizational innovators present a challenge for digital initiatives to pick up traction (Fitzgerald et al., 2013). These resources include, for example, time for developing digital initiatives and a supportive information technology infrastructure (Westerman et al., 2011; Kane et al., 2015; Pralahad & Krishnan, 2002). Westerman et al. (2011) argue that digital initiatives are built on a solid IT foundation providing necessary processes, data, solution delivery and the capabilities to create and extend digitally operated environments. They also claimed that a strong and collaborative relationship between IT infrastructure and business processes is very helpful in driving digital transformation. A key resource worth mentioning as an individual transformation challenge is the **lack of funding** (Westerman et al., 2011; Fitzgerald et al., 2013). Direct monetary investments are often necessary for implementing digital initiatives eventually (Westerman et al., 2011) and the lack of funding is perceived to be the second-largest challenge of digital transformation in a survey conducted by Fitzgerald et al. (2013). This categorization of digital transformation challenges and the according literature is summarized in table 3 below.

Table 3: Digital transformation challenges

Digital transformation challenge category	Digital transformation challenge	Literature describing the challenge
Transformation challenges	Lack of impetus and urgency	Westerman et al., 2011; Fitzgerald et al., 2013
	Lack of transformative vision	Westerman et al., 2011; Fitzgerald et al., 2013, Kane et al., 2015a; Kane et al., 2015b
	Threatening of current power structures	Pagani et al., 2013; Westerman et al., 2011; Fitzgerald et al., 2013
Innovation challenges	Cultural issues	Westerman et al., 2011; Fitzgerald et al., 2013, Kane et al., 2015a; Kane et al., 2015b
	Lack of skills and capabilities	Lenka et al., 2017; Westerman et al., 2011; Kane et al., 2015a; Kane et al., 2015b
	Siloed business units and lack of collaboration	Westerman et al., 2011; Fitzgerald et al., 2013, Kane et al., 2015a; Kane et al., 2015b
	Unclear business cases	Westerman et al., 2011; Fitzgerald et al., 2013
Governance challenges	Coordination issues	Westerman et al., 2011; Fitzgerald et al., 2013
	Lack of resources	Pralahad & Krishnan, 2002; Westerman et al., 2011; Fitzgerald et al., 2013
	Lack of funding	Westerman et al., 2011; Fitzgerald et al., 2013

Intrapreneurship

Several digital transformation challenges can be answered with a top management-led digital strategy as described in the digital strategy section of the literature review. However, the literature review on digital strategy shows, that the focus of management literature on digital strategizing leans heavily on top-down managerial actions that answer the transformational as well as governance challenges rather well. What digital strategy literature lacks is a comprehensive approach to dealing with innovation challenges, i.e. ensuring the quality and quantity of digital initiatives emerging within the organization.

The source of organizational innovation activities, technological innovations and firm renewal and transformation is often organizational intrapreneurship (e.g. Benitez et al., 2010; Molina & Callahan, 2009; Morris et al., 2006 and Burgelman, 1983 and Christensen, 2005). Thus, this thesis aims to complement digital strategy literature with intrapreneurship literature and presents intrapreneurship as a vital source of digital innovations. Championing intrapreneurship can be considered especially important in overcoming innovation challenges described in the transformation challenges -section. As a result, this thesis proposes that a comprehensive digital strategy should encompass enabling and encouraging intrapreneurial activity when dealing with innovation challenges of digital transformation.

Intrapreneurship has several definitions in management literature depending on the emphasis of the research. These definition vary for example from pursuing business opportunities independent of the resources, in ways diverging from customary to the creation of new internal sub-organizations and adapting to environmental demands (e.g. Stevenson & Jarillo, 1990; Antocic & Hirsch, 2001; Sharma & Christman, 1999). This thesis defines intrapreneurship similarly to Rule and Irwin (1998) as the culture that encourages creative and innovative activities and the means by which the organization identifies and promotes the emerging new ideas,

products and operating models. Management literature uses several terms such as corporate entrepreneurship and corporate venturing as more or less synonyms for intrapreneurship (Christensen et al., 2005). This thesis uses consistently the term "intrapreneurship" and considers other similar terms to be rather direct synonyms describing essentially the same phenomenon.

In modern, changing business environments, investing in innovation strategies is vital for organizations (Benitez et al., 2010) and there is no reason why digital strategies and business model innovations should be any different. The literature on digital transformation and digital strategies further highlights the importance of transformative innovations. Even though the frames of digital transformation are often driven by a strong organizational vision from the top management, the actual innovations are often created by individuals or collaborating groups within the organization. Digital development increasingly distributes the innovation of products and processes to different organizations across industries and to different actors within these organizations (Yoo et al., 2012). Yoo et al. (2012) also state that the information technology and digital technologies have democratized the innovation process, and that the locus of innovation activities is constantly moving towards the peripheries of the organizations. In such a situation, organizations need to engage their employees completely in order to create novel innovations that transform the organization to the direction that the organizational vision suggests (Kane et al., 2015a).

The efficient, organization-wide intrapreneurial activities that enable benefiting from changing business environments through new products, services and business models is only possible in a suitable organizational culture (Alpkan et al., 2010). For a firm to be internally innovative, its culture has to promote the importance of innovating constantly (Khazanchi et al., 2007). A major asset of this intrapreneurial culture are the practices, values and norms that support the creative and innovative processes of individual employees of the organization (Menzel et al., 2007). These

innovating individuals, namely intrapreneurs, are often responsible for creating the new businesses and are a major determinant of innovation within the organization (Molina & Callahan, 2009; Benitez et al., 2010).

The intrapreneurial process starts from the recognition of a new business opportunity and ideally results in a new means to serve a certain market demand (Menzel et al., 2007). In addition to the encouraging culture, the key personnel (namely managers on different organizational levels) as well as interactions between individuals affect the intrapreneurial initiatives (Menzel et al., 2007). It is noteworthy that these organizational characteristics are not binary, and the resulting degree of intrapreneurial activities is a continuum (Antocic, 2003).

The drivers and enablers of intrapreneurship are a lot discussed topic and there are different emphasizing and categorizations for organizational enablers of intrapreneurship (e.g. example Kuratko et al., 1990: Hornsby et al., 2002; Christensen, 2005). This thesis focuses on the internal enablers of intrapreneurship that are commonly agreed on intrapreneurship literature and that can be considered the most important ones for emerging and developing of innovations. These enablers are the appropriate use of rewards, top management support, resource availability, supportive organizational structure and risk taking and tolerance for failure (e.g. Hornsby et al., 2002; Kuratko et al., 1990 and Christensen, 2005).

Table 4: Enablers of organizational intrapreneurship

Enabler of intrapreneurship	Requirements for successful intrapreneurship	Authors
Appropriate use of rewards	Effective reward system should consider goals, feedback, individual responsibility and incentives	Hornsby et al., 2002; Kuratko et al., 1990; Sykes, 1992
Top management support	Championing innovative ideas, institutionalizing entrepreneurial activity within the firm	Hornsby et al., 2002; Kuratko et al., 1990; Stevenson & Jarillo, 1990; Hisrich & Peters, 1986
resource availability	Sufficient resources (including time) available for intrapreneurial initiatives	Hornsby et al., 2002; Kuratko et al., 1990; Hisrich & Peters, 1986; Von Hippel, 1977
Supportive organizational structure	Organizational structure that allows execution of initiatives and administrative mechanisms that evaluate, choose and implement ideas	Hornsby et al., 2002; Sykes, 1986; Christensen, 2005
Risk taking and tolerance for failure	Management is willing to take risks and show a tolerance for failed initiatives	Hornsby et al., 2002; Christensen, 2005; Kuratko et al., 1990; Burgelman, 1983; Stopford & Badenfuller, 1994

The literature review should provide a solid theoretical foundation for this thesis. The objective of the empirical section is to build on this foundation by applying the transformation challenge framework to the case context and answer the first research question concerning challenges of digital transformation through it. Then the thesis aims to answer the second research question concerning digital transformation process by illustrating the transformation process in the case company. The foundation for this analysis is based on digital strategy literature encompassed with the tools associated with intrapreneurship.

The premise of the empirical part is that a coherent digital strategy provides the guidelines and vision for digital transformation, sufficient organizational capabilities and processes for evaluating and implementing digital initiatives, but does not per se create digital innovations. The intrapreneurial activity in an organization, however, ensures sufficient creation of digital initiatives and innovations that can be fostered to become the drivers of digital transformation.

Methodology

The case company and its relevance for the study

The case company of this single-case study is Fira Group, a Finnish construction company. Fira Group is an interesting and well-suited case company for this study on organizing and facilitating digital change, because of both its internal characteristics as well as the relatively early phase of digital transformation of the industry. The phase of the digital business development process offers interesting aspects, as the digital strategy is still in its infancy within the organization and especially in the construction sector in general.

As a result there is clear emphasis on the importance of digital strategy, but at the same time the term "digitalization" and the effects of the phenomenon are regarded very differently within the organization. The development of digital business models is not organized top-down in hierarchy, but rather the individuals within the company have been given a lot of freedom to pursue the development paths they see as the most promising ones.

This freedom and lack of hierarchy within the organization manifests on how the digital development progresses in Fira Group. The interviews showed that even though there is cooperation between certain business units, this cooperation is rather informal and depending more on the individual relationships between the people in the organization than any explicit organizational structure.

The result of such a situation, where the significance of a phenomenon is recognized, but the resulting effects on current and potential future business models are not explicitly defined is interesting from the management literature point of view. The result in Fira group is a situation where the individual employees and especially the co-owned startups are given a lot of freedom, but at the same time,

they have to be able to independently justify their access to corporate resources as well as their legitimacy within the corporation (e.g. Alt & Craig, 2016).

Research approach

The study was conducted as a single case study focusing on qualitative analysis. As Yin (2009) states, case studies are suitable for situations that emphasize thorough understanding in an individual setting, that focuses on contemporary events. A single-case setting is also commonly regarded to be suitable for the exploratory nature of a specific setting. The data was gathered through semi-structured interviews and qualitative analysis was used as the core method of analysis.

This single-case setting is also supported by the observation that digital transformation process is seen to manifest differently in differing industries and organizations, and thus the case company context is unique. The thesis aims to the deepest possible understanding of the case company's digital transformation process in its context, and thus a single-case setting was chosen. According to Eisenhardt (1989), a case study is a good fit for such an objective to understand the dynamics in the single case context.

There is a common concern that case studies provide little basis for generalization, but Yin (2009) states that case studies can be generalized to the limits of their theoretical proportions. However, learning from an individual case in its context should not be overlooked (Dubois & Gadde, 2002). According to Dubois and Gadde (2002), understanding the interaction between the phenomenon and its context often requires in-depth case studies. Comprehensive theories are usually based on multiple studies focusing on the same phenomenon under differing conditions, and single case studies can be used to expand and generalize these theories (Yin, 2009).

A case study is often highly iterative, and the researcher should not be set to find answers to pre-determined questions, but rather be focusing also to finding

unexpected results (Eisenhardt, 1989). After initial definitions of motivation and context of the study, the research process followed quite well the case study structure presented by Yin (2009).

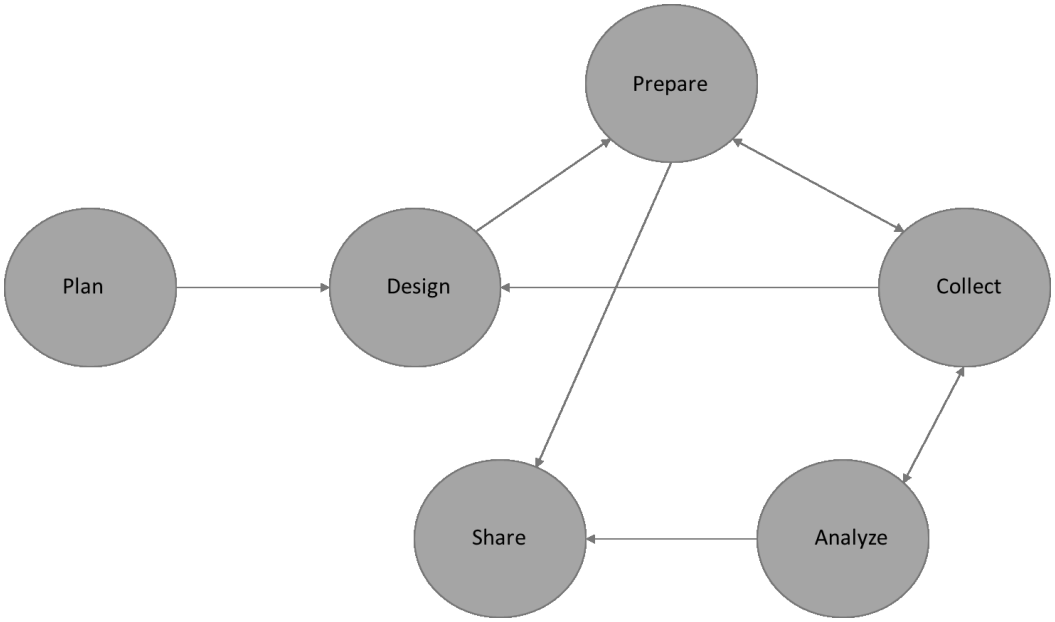

Figure 4: Case study process (Yin, 2009)

Data collection

After the initial literature review and familiarization to the case company, I conducted the first interview as a reference point and in order to select further interviewees within the case organization. In addition, the first interview helped to clarify the interview focal points as well as the structure of the interviews.

After the first interview, an initial structure for the future interviews was set. This structure had certain fixed sections, but some sections were altered for different interviewees, as the aim was to focus on their specific areas of expertise. The interviews were relatively free discussions concerning the pre-selected topics, and the conversation allowed even completely new topics to be discussed in the hopes of finding unexpected results or points of view. The bulk of interviews took place

between early January and early March, with the exception of the concluding discussion with CTO Otto Alhava in June.

The data collection method was semi-structured interviews. Interviews were chosen as the data collection method because they are suitable for focusing directly on case study topics and are insightful in the case context (Yin, 2009). The interviews were rather guided conversations than rigidly structured interviews and although they aimed to collect data relevant to the research objective, the discussions were relatively free and fluid.

The main data consists of ten roughly one-hour interviews and one two-hour open discussion. This is the dataset used to evaluate the research questions in the case context. The following table introduces the interviewees, their positions and the duration of each interview.

Table 5: Summary of research data

Interviewee	Position	Date	Duration
H1	VP, Strategy and Business Development	11.1.2017	0:47
H2	Co-founder of Hive	24.1.2017	0:55
H3	Co-founder of SiteDrive	25.1.2017	1:00
H4	Platform Developer	27.1.2017	0:56
H5	Project Development Director	3.2.2017	0:59
H6	Phenomenon Creator	6.2.2017	1:12
H7	Chief Operations Officer	14.2.2017	0:44
H8	Co-founder of Fira Flow	3.3.2017	1:23
H9	BIM professional	3.3.2017	0:53
H10	Sales Director (Fira Services)	3.3.2017	1:03
H11	Chief Technology Officer	17.6.2017	2:05

The interviewees were selected because of their positions within the organization as well as through recommendations of previous interviewees. While discussing certain topics during the interviews, it was explicitly asked if the interviewee knew anyone within the organization with expertise on the specific subject. The selection of management personnel interviewed emphasized their knowledge on digital

technologies and digital transformation. However, in order to reach a comprehensive, organization-wide view concerning digital transformation and innovation in the digital era, interviews with management personnel working in for example operations and sales were included in the data collection.

In addition to this main dataset, supportive data from previous interviews with Fira management personnel was used. This data was gathered in the context of a relatively similar case study for Fira in the spring of 2015, and consists of 17 roughly one-hour interviews. The thesis utilizes the transcriptions of these interviews in analyzing the culture and history of the case company, as well as for example the development phases of Fira's business strategy. Along with interviews, I chose to utilize secondary sources such as Fira's annual reviews and press releases for company description and especially research and interview planning.

The actual interviews process started by contacting the desired interviewees through e-mail, which described the objectives and goals of the thesis. The interviewees answered with their preferred date and location for the interview and the practicalities were agreed on as fast as possible. All the interviews took place either in the case company headquarters or in the conference rooms of Aalto University in Otaniemi. The interviewees only received the general topics of interviews with no actual questions sent beforehand. The interview guides were different for each interview in order to focus on the specific knowledge of each interviewee. The thesis presents Finnish and English examples of an interview guide in Appendixes I and II. All the interviews were in Finnish language, as that was the native language of all the interviewees as well as interviewers.

All the interviews began with the interviewees describing their position within the organization and the interviewers describing the motivation and goals of the study. Then we discussed the general topic of digital transformation and its manifestation and consequences in construction industry. After digital transformation, the interview shifted more closely to consider the digital strategy of Fira: How digital

business was structured, how innovations were created and managed and how the significance of the digital strategy was perceived in different levels of the organization. Finally, we discussed the challenges of managing digital business transformation and creating and implementing a digital strategy in the construction industry.

Data analysis

All the interviews were recorded with the permission of the interviewees and the analysis started with full transcription of the interviews. After the transcription, all the interviews were carefully read through and an initial thematic analysis was conducted. The researcher then categorized the interview material under few initial themes such as the significance of digital transformation to construction industry and case company, the organizational vision of the case company, the current digital strategy of the case company, the challenges for digital transformation and the current digital initiatives. The conclusive analysis aims to develop further understanding through a systematic combining of theoretical knowledge and case-specific, in-depth insights of the empirical phenomenon and its context as described by Dubois and Gadde (2002).

The data analysis was an iterative process by nature, as is common for the analysis of case studies with qualitative material (Eisenhardt, 1989). After the initial review and categorization of interview themes, I identified intrapreneurship as a secondary research stream. This recognition required for additional literature concerning the new topic. After this initial analysis, all the interviews through more carefully and the thematic approach was finalized.

After a thorough review of interview materials and describing the manifestation of digital transformation in the case company context, I searched and tabled the suitable interview quotations regarding both transformation challenges Fira has faced as well as the managerial tools utilized in each situation. These quotations

were then combined to the transformation challenge –framework based on literature review in order to create an in-depth understanding of the managerial tools for overcoming digital transformation challenges. Through this analysis in the first section of findings, this thesis aims to answer the first research question regarding digital transformation challenges in a traditional industry setting.

The second section of findings uses these transformation challenges and managerial tools together with further empirical evidence in order to answer the second research question concerning digital transformation process. The analysis identifies the transformation path Fira has taken and the relevant managerial actions in each phase of the transformation. Last, the thesis compares the empirical evidence to the relevant literature and aims to interpret the insights into generalizable results.

Digital strategy in Fira

Fira Group consists of three relatively independent business units: Fira Oy, Fira Palvelut Oy and the Digital Business Unit. The largest and oldest one of them is Fira Oy, focusing on developing and implementing construction projects. Fira Oy was founded in 2002 and had a revenue of 139 M€ in 2016. The other main source of revenue is Fira Palvelut Oy, a company focusing on pipe renovation services in major Finnish cities, mainly in the Capital area. Fira Palvelut Oy was founded in 2010 and yielded a revenue of 29M€ in year 2016.

The third unit is the relatively new Digital Business unit that Fira founded in order to pursue the benefits of digital transformation and to create and implement digital initiatives. The Digital Business unit does not yet have a significant role in generating revenue, but its strategic importance and potential are appreciated highly. In the following sections, this study mostly concerns Fira Group as a single company referred as “Fira”, whereas the individual business units are referred as Fira Construction, Fira Services and Digital Business.

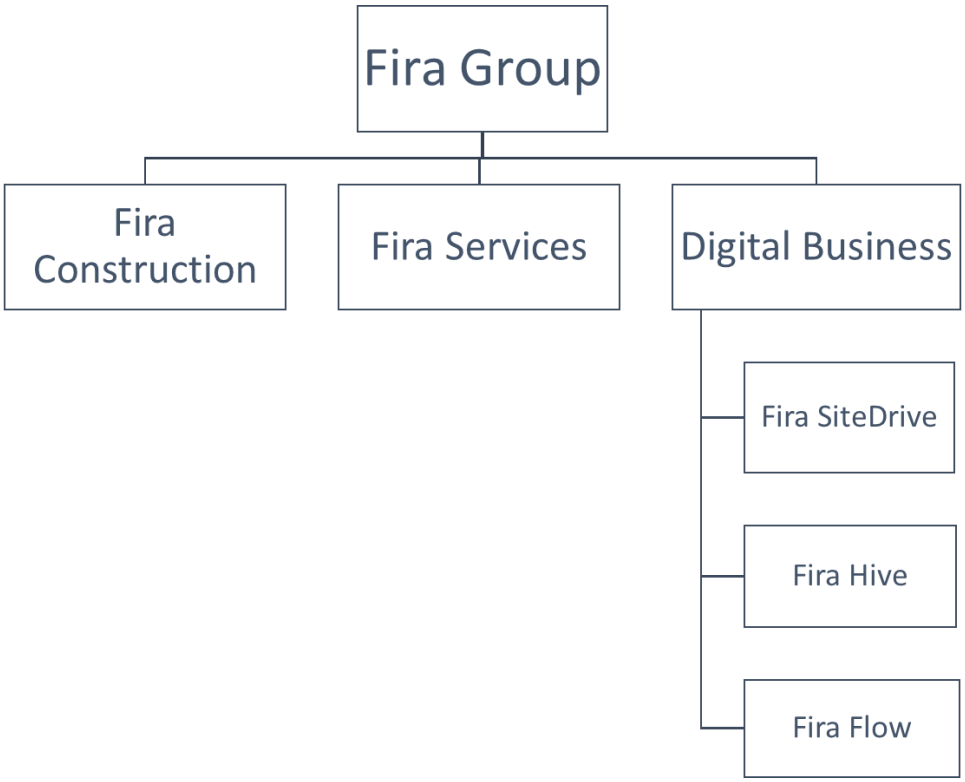

Figure 5: Fira Group's organizational structure

Fira Construction focuses on large-scale construction projects, covering most of the value chain from project development to implementation. Fira Construction differentiates from major construction companies by keeping a light balance sheet, for example, by choosing not to own the properties in their construction development projects. Fira Construction also aims to foster an innovative and customer-oriented approach in their actions, both in internal development and personnel management as well as in all aspects of the customer interface.

The innovativeness and pursue for a "smarter" construction industry has yielded several new concepts such as alliance-building and community building. Alliance-building is an operating model where instead of dividing development projects to small sub-tasks and purchasing the execution as cheap as possible, all stakeholders including the subcontractors form an alliance where they all benefit from the swift and cheap execution of the project as a whole. Community building aims to do a

similar inclusion of stakeholders in the development project, but by including the eventual property owner to the complete development project from as early stages as possible.

The second-largest business unit, Fira Services, focuses on pipe renovation projects. Fira Services has a similar innovative approach to business development as Fira Construction, and has similarly launched transformative business concepts. The main novel concept is Fira Ketterä, the two-week pipe renovation concept that received wide national media coverage during its recent introduction. In addition to innovative approach, the two larger business units also share similar emphasis on customer-oriented approach in all their operations.

The capital intensity and long investment periods along with established actors and relationships have formed construction industry to what can be considered a rather conservative one. However, challenging some of the dominant institutional beliefs of the construction sector has resulted in 42,2% compound average growth rate for Fira since 2009, which is impressive on a highly established industry with a CAGR of 4,8% on the same period.

The third business unit of Fira Group is the recently founded Digital Business unit, a rather independent business unit that fosters the development of new startups that aim to develop digital solutions for construction and residential businesses. Fira Group and the founding entrepreneurs divide the ownership of the start-ups and Fira Group offers the startups corporate resources in areas such as accounting, marketing, office spaces etc. It is noteworthy that Fira fosters and funds such a startup-accelerator not purely as an investment, but as means to pursue a new strategy by developing new digital solutions and novel digital business models, and in cultivating a fundamental transformation in construction and residential sector through digitalization.

These digital solutions and their proposed business models are seen to be the key in shaping the digital possibilities into value-generating businesses that are then integrated into Fira's operations. Even though the digital business initiatives are considered independent of the two other business units, the existence of different business units offers synergies. Digital business initiatives offer novel solutions and innovations to traditional business units, and traditional businesses offer the digital initiatives resources, information as well as an in-house testing laboratory.

The decision to separate digital business from the more traditional offerings is mainly strategic. In the core of the digital development are the industry-transforming, novel business model innovations in construction and residential sector. These innovations may clash with the business logics of the more traditional businesses, however innovative the other business units aim to be. The separation of the digital business development to its own entity ensures that the transformational nature of the development projects remains intact and the development projects are not directed by the needs of the larger business units working with more traditional business model.

Evolution of Fira's strategic phases

Throughout the interviews it was clear that even though Fira is a relatively new actor and has grown rapidly both in terms of revenue as well as personnel, the interviewees had a clear and coherent sentiment on organizational vision and values. In addition, they identified strongly with the long-term vision of the future of the company as well as the perceived future of the industry as a whole.

In the core of this organizational vision is what Fira has branded as "building a smarter society". What this refers to, is the pursuit to keep up with the changes in the ways people live and within the construction industry and in cooperation with the customers, develop the solutions through which long-term customer value is created. This vision is then further refined into communication both within the

company and to outside stakeholders through ideas such as presenting construction as a service, highlighting the customers need and the long-term customer value created as the starting point of all operations, and focusing on the possibilities presented by technological and especially digital development.

Fira's grand vision of building a smarter society has remained rather stable throughout the years, but the strategies aiming to realize this vision have varied strongly. Since the founding of Fira in 2002, three clear strategic phases can be identified, the first focusing on traditional construction, the second on construction as a service and the third on opportunities provided by digital transformation. The following table 6 describes the characteristics of each phase in terms of value creation, value capture etc.

Table 6: Evolution of Fira's strategy

Phase	Traditional construction (-2009)	Service transformation (2009-)	Building movement (2015-)
Vision	Traditional construction	Solution provider in collaborative industry	Building movement
Core of strategy	Smart engineering	Collaboration	Digital platforms
Goals	Operational excellency	Co-creating superior customer value	Scalable digital business models
Core competences	Engineering	"Solutions to needs"/resource integrator	Network creation and facilitation
Business model	Asset builder	Service provider	Technology creator/network orchestrator
Value creation locus	Within the organization	In the collaboration with the customer	Interactions within the network
Challenges of business model	Low scalability	Low scalability, low profitability	Developing required capabilities

Traditional construction

The first phase of Fira's strategy and vision focused on operational excellence in construction projects, especially projects involving demanding concrete structures. The vision of smarter constructing was realized through smarter engineering and smarter construction solutions, but the underlying value creation model and basis of competitive advantage did not differ from the construction industry. The value creation model was a traditional pipeline value chain, and the business model was similar to most traditional construction companies: bidding for and executing fixed-price construction projects. The underlying assumption in such a business model is that manufacturing the physical products is the sole source of value creation, and that the value creation takes place almost completely within the manufacturing company (Grönroos & Voima, 2013). As a manufacturer, the key competitive advantages revolve strongly on operational excellence through, for example, better engineering know-how and on-site efficiency.

Service transformation

The second phase of Fira's strategic development started in 2009, when the strategic focus shifted from traditional construction to bringing service construction to the core of Fira's business activities. Recent industrial management literature has acknowledged the vastly increasing importance of bringing in services to the business activities of traditional manufacturing firms in order to differentiate from the competitors, add value to the customers and increase their potential revenue streams (Olivia & Kallenberg, 2003; Woodruff, 2007). This service transformation has been a focal point in strategies of a large part of the manufacturing companies for some time, but has not yet been widely adopted in Finnish construction sector. Fira, however, aimed in 2009 to achieve a competitive advantage and faster-than-industry growth in the construction sector by being the first Finnish construction company to implement organization-wide service transformation. This service

transformation meant changing the organizational business logic from an asset builder to a service provider.

Perhaps the most common approach to service transformation in manufacturing industries is adding services to the material products and bundling them to the physical offerings (Olivia & Kallenberg, 2003). The solutions offered by manufacturing companies range widely from guaranteed uptimes of elevators and escalators offered by manufactures to the airports, to turnkey solutions and maintenance packages offered by equipment manufacturers to the paper and pulp manufacturers. However, rather than just adding complementary services to their physical products, Fira has focused on importing the logic of value co-creation into construction industry. The co-creation of value is a term introduced by Prahalad and Ramaswamy (2000) and refers to viewing the value creation process as a joint process of the company and its customer rather than simply the manufacturing process taking place mainly within the supplier company (Payne et al., 2007, Vargo & Lusch, 2004). Thus, from Fira's point of view, the core of service transformation centralizes on shifting the focus from operational construction and engineering excellence to the competence of creating maximal customer value in cooperation with the customers.

This introduction of service logic to construction industry resulted in several new types of solutions provided by Fira, the most notable ones probably being Fira Verstas and the Big Room project planning. Fira Verstas is a service aimed to clarify and formulate the exact customer needs and preferences and plan the project accordingly from the very beginning. The Big Rooms were a widely used approach to involve all key stakeholders and to replace the traditional planning meetings. In addition to these concrete service offerings, Fira aimed to optimize their transactions on customer interface. These actions included things such as minimizing the resident inconveniences during renovation projects and allocating construction site bonuses according to customer satisfaction that was surveyed after

each project. A focal part of this added introduction of service logic to construction industry was also structuring the organization so that Fira Services would be its own entity.

This shift of focus allowed Fira to grow aggressively and organically in the rather stagnant Finnish construction industry. The implementation of service transformation and its core value creation logic allowed the company to fulfill their aggressive growth objectives to get above 100M€ in revenue by 2014 from the 14M€ it was in 2009.

Digital transformation and building movement

Fira's third and latest strategic phase began in 2015 and the growth focus was shifted from revenue to valuation. Fira decided to aim to grow the valuation of the company to 1000M€ within five years by tackling the relatively low scalability of construction sector through digital solutions and new value creation and business models. In the latest phase of Fira's strategy development, the initiative is to differentiate from the traditional business models of construction industry and create a new strategy based on their vision of the future of the construction industry.

According to Fira's current future vision, digital networks and the platforms and sub-platforms created by digital development are currently changing the nature of industries by allowing people to be more consistently and deeply linked to each other than ever before. Digitalization will be in the core of the transformation of industries, and modern digital technologies will be a vital component of successful future network-based business models. In addition, the current megatrends such as rising costs of living and urbanization combined with opportunities presented by new technological breakthroughs and digitalization enable new configurations for organizing the construction industry. Rising costs of living in growing urban areas create pressure towards a change on the fundaments of construction industry and digitalization enables the providing of digital, interactive platforms to engage

customers and implement value co-creation strategies. Central in the development of the industry will be the decreasing role of large property developers and traditional construction firms and bringing individuals to the core, in both customer as well as the manufacturing side of the new network of individual actors:

"What we believe is that we should be able to empower housing communities, i.e. the next billion of people that are moving to urban areas, and on the other hand the executing communities, the millions of people who do the construction work for living, so that they could directly link into the work and value created, without current unnecessary gatekeepers and middlemen." (H1)

Fira has labeled this vision of institutional transformation in the construction sector as "building movement" and their aim is to have a focal role in the change process. However, such a complete, industry-wide transformation is too fundamental a change for any single company to accomplish. Rather, the short-term vision of Fira is to be on the forefront of this institutional change, having a focal, active role narrating the movement towards the new normal of construction and real estate industry.

The key objective of Fira's latest strategy phase is to tackle the low scalability of construction business. Aside from brand recognition, operating in different cities, let alone internationally, offers few practical advantages. Digitalization-driven institutional change is seen as the fundamental way to break this logic and bring scalability into the operations of Fira.

"The though, in a way, is to break the problem of scalability in construction industry. The construction industry is not scalable in the way that if we were to operate in Turku, we would get absolutely no synergies or advantages from operating in Helsinki." (H10)

Instead of the traditional construction business with highly limited scalability and economies of scope and scale, Fira aims to create business opportunities based on

a position as a technology creator or network orchestrator in a wider network of customers, manufacturers and service providers as described by Libert et al., (2016). This transformation of business logic, however, is a relatively difficult one, as it transfers the model of value creation from manufacturing and collaborating to facilitating the interactions of individual actors in this new network (Libert et al., 2016).

Fira's digital strategy

Fira's approach to digital strategy builds strongly on two aspects: their vision on empowerment of housing communities and executing communities, and the strong culture of intrapreneurial activity and trial-and-error on all organizational levels. The top-management -led vision is communicated throughout the organization and presents guidelines and frames to all digital initiatives. At the same time, the strong culture of intrapreneurship and trial-and-error along with low hierarchy in decision making ensure the amount and quality of individual digital initiatives.

Fira's digital vision – the hourglass model

The vision that is focal to Fira's digital strategy focuses on the premise that platform ecosystems and the networks they create will capture market share from the current asset-heavy pipeline value chains that are most common in the industry. The development of information technology enable cheaper and simpler creation of digital platforms that connect larger and larger amounts of people on both sides, and these platforms replace the traditional pipeline value chains. This, along with the digitalization-enabled breakdown of larger projects into easily managed sub-projects, allows the linear value-chain to be replaced with an ecosystem where the most value is created through both same-sided as well as cross-sided network effects. Thus, this digital transformation requires not only the adoption of new technologies to enhance operational efficiency, but rather a completely new logic of value creation. This type of new network-based logic of value creation does not

happen within one organization, and requires overcoming several organizational and institutional barriers. In Fira, however, there is a strong sentiment that such a transformation is going to take place in construction industry, and Fira wants to be one of the actors narrating it.

"The transformation and digitalization of the value chains in construction industry requires a thousand companies. Fira cannot do it alone. But we want to be the ones narrating the transformation and that is why have started to narrate this building movement " (H1)

The shared understanding at the core of Fira's digital strategy is what is referred as the hourglass model within the organization. The hourglass model refers to an industry-wide multi-sided platform where the housing communities are on one side and the executing communities are on the other side. In such a platform the key function of Fira would not be that of a traditional construction company, but to facilitate the cross-side interactions between the housing communities and the executing communities, and also facilitating same-side interactions in for example the creation process of these communities. Here the locus of value creation is specifically associated with facilitating these interactions rather than traditional manufacturing, and the capital is mainly network capital rather than any tangible assets.

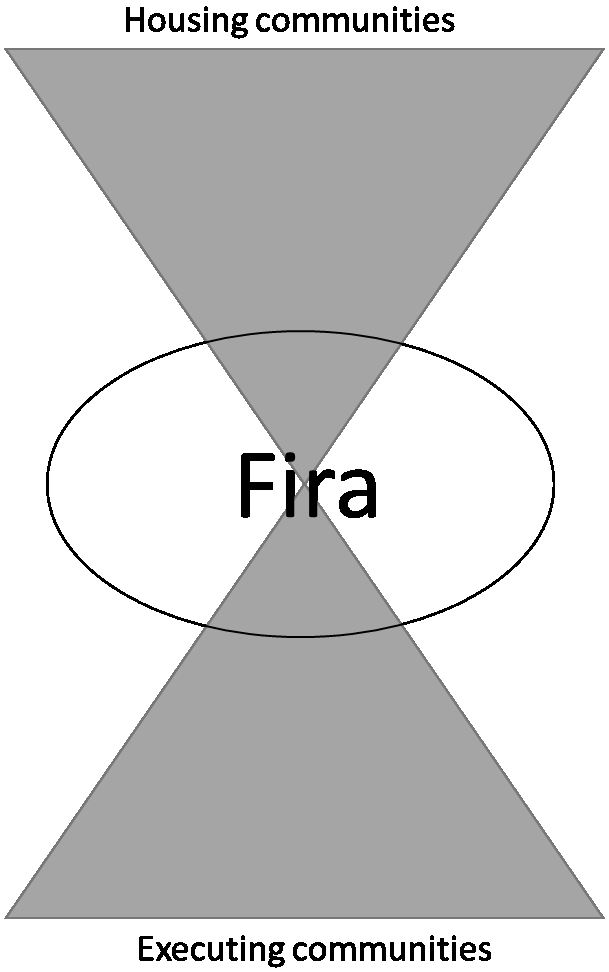

Figure 6: Fira's hourglass model as pictured by several interviewees

Unlike often described in platform literature, this hourglass model is not a private platform hosted by a single entity, and Fira has no ambitions to be the sole actor creating such a complete ecosystem. It is the grand view of the industry that is realized by several companies working in collaboration, creating sub-platforms and digitally enabled services, enabling the creation of these communities and connecting them to each other. These solutions do not cover the entire value chain of the construction industry, but they rather replace certain actors or transactions within the entire value chain. As such, they present clear economies of scale, are scalable and offer international expansion opportunities.

This leads to two-fold requirements for Fira's digital strategy implementation. Firstly, Fira has to be championing the open platform logic in an industry that is currently a relatively conservative and rigid in terms of actors and their relationships as well as value creation logics. Secondly, Fira has to be able to recognize opportunities for sub-platforms and digital solutions within the larger scheme of things and realize these opportunities efficiently.

"We want to implement a platform-logic where all the companies have an opportunity to attach to it. Then we want to create value through individual, focused services that answer specific customer needs." (H1)

Even though several interviewees referred to the hourglass as a platform, Fira's hourglass model is not a view of a "platform" per se, but rather an ecosystem that fosters the creation of smaller platforms. These smaller platforms are scalable and global in a way that is entirely new in construction sector. In addition to bringing scalability, these new platform-based business models allow companies to create value through facilitating interactions rather than through asset-heavy value chains. Facilitating this value creation process and capturing some of the value created also allows Fira to increase its valuation in a way that is not possible for a traditional construction company. Thus these new business model are essential in Fira's attempt to grow its valuation to 1000 M€ within five years, as it is almost impossible by simply scaling up the traditional construction business.

"We want to create value for the society in a way that matters, because you cannot do that in the role of a traditional construction company. You cannot be significant in a way that is comparable to the most valuable corporations in the world." (H1)

Digital initiatives

Fira's digital initiatives can be divided into internal development projects and startups working under the Digital Business unit. The internal development projects have usually been a bit more complementary with the core construction business

whereas the startups under the Digital Business unit focus on creating transformational change in construction sector by creating new digital platforms connecting different actors in the industry.

The startups were chosen if their vision is considered to be in line with the "building movement" Fira is aiming to narrate and fit to the hourglass model through which they view to be the future of the industry. Interestingly, there are no real requirements set on the strategic focus or exact monetization models of the startups. However, it is made clear that these startups do not aim to simply create concepts to support Fira's current operations, but rather they aim to create networks that reach out to the whole industry. For example, Fira SiteDrive is a startup developing a construction site management software, and it has been clear from the beginning that it is not developed solely for Fira, but rather to be utilized by all actors in the industry, whether they are Fira's competitors at the moment or not.

At the time of the bulk of the interviews, Fira had three startups under its Digital Business unit: Fira SiteDrive, Fira Hive and Fira Flow. Supporting the current and future digital initiatives Fira has fixed personnel such as the director of the starters, and a full-time platform developer. In addition, Fira has constant ongoing interactions with external "startup coaches" from different organizations such as Finnish universities.

All Fira's startups worked under the same premises: they were given funding and Fira and the founding entrepreneurs divide the ownership. They can utilize the corporate resources, and after a year the continuation of the startup is evaluated: whether it is integrated further into Fira, continues as is or is deemed not to be suitable to continue under Fira. During the first year, the startups were given an extensive freedom and there are no real requirements on the revenue generation or user acquisition. Instead, the startups need to be able to display a new digital business model and show how it is able to create value and capture part of the value created.

Interestingly, all Fira's current startups seem to identify themselves really strongly as a part of Fira rather than individual companies funded by Fira. In addition, there is a strong sentiment in Fira that the startups are Fira's development projects rather than individual startups. This identification, along with Fira's high ownership percentage of the startups, is to the extent that it can be argued whether they are actually startups. Although they are consistently referred as startups, it should be highlighted that in the context of Fira that these "startups" are rather business development projects independent from current revenue-generating businesses than actual independent startups.

"Although I am in a startup, I still consider issues from Fira's point of view. I can say that my heart beats for Fira, not for the startup." (H8)

"I'll give you an honest answer, I don't think we have a single startup, we have only development projects." (H4)

Fira SiteDrive is a technology startup, partially owned by Fira Group and partially by the initial entrepreneurs. The core product of the startup is a construction site management software that aims to divide complex tasks into narrower sub-tasks and manage the execution of these sub-tasks efficiently. At the same time, the software collects real-time data from the construction sites. The more efficient management of both workforce and individual construction sites allows more efficient project execution with shorter lead times and enhances the efficiency of the workforce, increasing margins for projects.

The vision behind Fira SiteDrive revolves around integration of information from different sources and transferring this information into efficient tasking and distribution of the workload. The premise is, that Fira SiteDrive would be able to import the specific tasks into the software from an existing building information model, and schedule those tasks. They would have gathered the knowledge on the duration and sequence of these specific tasks, and defined the available workforce.

Based on this information, the software is able to optimize the schedule and improve both the lead times of pipe renovation projects as well as the productive working time of the subcontractors. The software also enables quality control during the process and on-site, as the next construction worker would be able to validate and assess previous work and provide feedback.

As one of the key strategic purposes of new digital business and start-ups of Fira is to create scalability beyond what is possible in traditional construction industry, the business- and monetization models of SiteDrive have created a lot of debate within the company. The debate has mostly been between value-based charging in individual projects or for individual contractors, and providing SiteDrive as a Software-as-a-Service (SaaS).

Another disruptive feature of the SiteDrive is that it decreases the role of sub-contractors as a part of the project execution. This is also well in line with Fira's vision to bring the individual peoples to the core of construction industry, as it brings the individual workers to the core of operations. As the software has knowledge on the duration and timing of individual tasks, it decreases the risks of contractors and sub-contractors and diminishes the necessity to sell larger parts of the projects to the sub-contractors. Normally the subcontractor has to take in part of the risks of the project and accordingly require a price premium for it. In addition, if the development of the software allows the breaking of a complete renovation project into single tasks and is able to schedule them optimally, the sub-contractor becomes a provider of capable workforce rather than an integral part of the

Fira Flow is a part of Fira's startup programme, aiming to bring together individual construction workers and connecting them efficiently to individual sub-tasks on construction sites. The product is a digital solution that collects clearly defined construction sub-tasks and sells them to individual workers registered to their site. This decreases the need of subcontractors and especially the need for

subcontractors' foremen and other managerial roles on-site, decreasing also the premium paid to subcontractors.

It works on the same premise as Fira SiteDrive, namely that the role of sub-contractors can be greatly decreased on construction projects without compromising the quality of the product. The goal is to integrate the information derived from modern building information models, Fira SiteDrive and Flow's own database of registered, qualified individual workforce.

Fira Flow's business model is built on the solution offered by Fira SiteDrive. The aim is to take a larger project that would usually be sold as such to sub-contractor or several sub-contractors. Instead, the project is divided into subtasks and brought to SiteDrive to be scheduled and managed digitally. Then Fira Flow takes each of these subtasks and sells them on their digital marketplace to individuals willing to perform the task on a given price. The workers then download the SiteDrive application, which arranges the schedules, and through the scheduling each individual knows when to be on-site and performing the given task. Each worker then informs in real time when he started working on the task and when it is finished, and thus it is constantly clear, which task is in progress and where, what still needs to be done and what is the estimated schedule of each site from that step on. After the task is done, the worker receives reviews from their task from the following workers on the same site and can charge for their work input directly through Fira Flow. In the long run, this process creates a database of active workers and their reviews, from which the building contractors can choose the ones they want working on certain projects distributed through Fira Flow in the future. Fira Flow aims to monetize this by including their fee in the price with which the tasks are sold to the final construction worker.

Fira Hive was the third initial startup under the Digital Business Unit. Unlike Fira SiteDrive and Fira Flow, Fira Hive concentrates on creating value on the end-user side of the residential industry. The megatrends that Hive is built on are the

increasing costs of accommodation especially in central locations and large cities and the increasing interest in sharing economies in general and co-living in particular. The premise is that a lot of resources such as kitchen and most of movables at home are not used most of the time, and could be used more efficiently. In addition, there is increasing interest in social living in communities rather than individuals demanding the whole residence as their personal space.

The solution that Fira Hive is offering is a two-sided platform facilitating the cross-network interactions between property owners/lessors and individuals interested in renting rooms in larger apartments. The platform also focuses on facilitating same-sided interactions between individuals on the same side of the network, allowing them to meet each other and create coherent groups that find it lucrative to live in the same community. The platform decreases the risk of clashes between community inhabitants by gathering like-minded people and allowing them to create communities they feel comfortable living in. At the same time the platform makes the process of co-renting a larger apartment easier for both the lessors and the residents and decreases the risks for both sides for example in situations where some of the residents move out of the apartment.

The business model of Hive is in line with the long-term digital strategy of Fira. It is built on the same premises with Fira's vision of urbanization and social living as a service. The strategy of Hive is to not have the ownership of the properties, allowing it to work with a light balance sheet and providing it the opportunity to scale the operations quickly and internationally. The value created is not derived by the assets on the balance sheet, but rather through creating a platform and facilitating interactions that create value for both sides of the network. The efficient execution of this business model requires large and active user pools on both sides of the network. In addition to inviting sufficient pool of potential residents, there is a need for a close collaboration with large, asset-heavy institutional investors, that make their profit through keeping the properties on their balance.

In addition to the startups, Fira has several **internal digital initiatives** aiming to exploit the opportunities of digital transformation. Maybe the most highlighted of these is developing the efficient usage of digital building information models combined to relevant real-time data on the work process as well as material flows etc. This development initiative focuses on digitizing the processes of existing construction business mainly on four different but interlinked areas: The planning and work orders, scheduling, real-time knowledge on stage and quality of operation and logistics. Digital technologies are considered to allow capturing and utilizing digital data on all these aspects, and this transformation allows huge efficiency leap on individual construction sites as well as increased efficiency on workforce allocation.

The most important aspect of collecting and utilizing real-time knowledge is still the fact that it allows transforming the project-centric approach of construction industry to process-centric approach utilized by most of the more developed manufacturing industries. The aim is to combine the knowledge of the necessary tasks and scheduling on individual construction sites to the real-time knowledge of construction project phase. This allows the efficient management of workforce and material flows, and the individual construction workers or groups are no longer tied to individual projects. They can rather be managed efficiently between construction sites, allowing them to focus on their specific area of expertise and cutting slack time from both project timelines and the workers' working hours. This is rather easily implemented if just there is real-time knowledge of the completed and following tasks and knowledge of what needs to be done and where, and the necessary materials are on site. This both improves the learning curve of individuals and teams and allows them to focus on the value-adding construction tasks.

Digital transformation in Fira

Managing challenges in Fira's digital transformation

The first research question concerns the common challenges in a digital transformation process. To evaluate these challenges in the context of Fira, a systematic analysis of the digital transformation challenges during Fira's transformation process was conducted. All the different challenge themes and the approaches to those challenges that arose in the interviews were categorized under the three literature-based digital transformation challenge categories and presented in table 7. In addition, if Fira has utilized certain managerial tools to overcome these specific challenges, the managerial tool is identified and presented in the same table. Later on, the specific challenges and their management is analyzed and discussed in further detail.

Table 7: Transformation challenges and managerial tools discussed in the interviews

Challenge category	Challenges identified in Fira interviews	Managerial tools identified in Fira interviews
Transformation challenges	- Lack of vision - Poor understanding of vision - Lack of impetus for change - Conservative industry - Lack of collaboration among industry actors - Closed interfaces of existing actors	- Creating a transformative vision - Communicating the vision internally and externally - Narrating the industrial transformation - Creating clear collaborative initiatives with direct short-term benefits
Innovation challenges	- Lack of intrapreneurial culture - Lack of required skills and capabilites - Lack of ability and motivation to change - Lack of novel digital innovations - Lack of collaboration - Unclear business cases of initiatives	- Fostering intrapreneurial culture - Allowing risk-taking and tolerating failure - Developing skills and capabilites internally - Recruiting skills and capabilites externally - Rewarding for successful initiatives - Fostering collaboration - Preventing siloing between units - Allowing initiatives with unclear business cases
Governance challenges	- Lack of coordination - Unclear roles and resposibilities - Lack of resources for developing initiatives - Lack of funding for developing initiatives	- Providing sufficient resources for new initiatives - Providing sufficient funding for new initiatives - Communicating the synergies of novel and traditional businesses

Transformation challenges in Fira

The digital transformation literature described three explicit transformation challenges: Lack of vision, lack of impetus and the threatening of current power structures. Fira's case illustrates the first two challenges and their respective managerial tools rather similarly as described in the existing literature. However, as explained in the literature review, the threatening of power structures most commonly refers to the internal politics defending traditional technologies and practices. Empirical evidence in Fira's case does not describe such an internal challenge. In Fira's case, the existing power structures considered to create inertia and resistance to change are external rather than internal and affect the digital transformation of the whole industry, not just the transformation of an individual organization.

The transformation challenges concerning **lack of vision or impetus** have not been of major issue in Fira's case. The interviewees were consistently of the opinion that Fira has been successful in creating and communicating a coherent and comprehensive organizational vision that is well adopted by a major part of the employees. Most of the interviewees explained the hourglass model when facing questions on Fira's digital vision and demonstrated both understanding and commitment to the vision.

"The core reason I came to work for Fira was that I believed completely in Fira's vision and mission for the construction industry. I fell for the vision hook, line and sinker!" (H4)

Fira has clearly been successful in managing its organizational vision, as even though it is one of the most cited digital transformation challenges in management literature, there was not a single interviewee that considered this to be an active challenge in Fira. Similarly, the interviewees felt that the top management of Fira has been able to communicate the significance of digital transformation for

construction industry as well as Fira, and thus there has been no lack of impetus concerning digital transformation.

On the other hand, the most common individual challenge the interviewees pointed out was the **conservative industry** and the difficulty of championing digital transformation in such an environment. The large existing actors in the industry have established rather rigid relationships and have little motivation to disrupt the existing value chains. Even though Fira as an organization does not lack impetus concerning digital transformation, construction industry as a whole does.

"There are long cabinet relationships between large actors, and they are in a complete status quo (...) The people who end up in construction industry rarely are the ones that have a strong drive for change. The construction industry is full of traditional networks doing what they are used to do" (H2)

What is more interesting, in addition to being the most cited transformation challenge among the interviewees, the issue of existing equilibrium between actors and their resistance to change did not yield concrete, successful actions that Fira would have taken to overcome the challenge. Several interviewees felt that if they had to name the most important challenge they currently had hindering the development of digital initiatives; it would be the conservative industry itself.

"The construction industry has never been forced to change or disrupted in any way. The people and established organizations are still sitting on their own data and information, and aim to keep out all new actors while digitalization is the one thing that could open up opportunities to disrupt the whole business ecosystem" (H4)

In contrast to digital transformation literature, Fira's case demonstrates a situation where the core transformation challenges and the existing power structures causing inertia are external rather than internal. In addition, the challenges presented by a

conservative industry with high inertia and a clear status quo are deeper and more complex than described in existing literature.

As the challenges of conservative industry are not internal and cannot thus be internally solved, Fira has struggled to overcome these challenges. The managerial tools they have tried to utilize have focused on narrating digital transformation of the construction industry and creating collaborative initiatives that have a clear, short-term benefit for participants, but the success of these tools have thus far been average at best.

"One concrete challenge has been when we are trying to sell our digital solution to other construction companies and pitch our idea. It is not an easy spot for them, a competitor trying to sell an IT-solution for them"

Innovation challenges in Fira

The innovation challenges proved to be the most discussed challenge category in terms of challenge themes, as most of the interviewees felt that ensuring the quality and quantity of digital initiatives and developing them consistently was of great importance. These innovation challenges as described by digital transformation literature are cultural issues, lack of skills and capabilities, siloed business units and lack of collaboration and unclear business cases. The empirical evidence in Fira's case is rather well in line with these challenges and illustrates them well, and there is no distinct deviation from the challenges described in existing literature.

The first major challenge for Fira in ensuring the quality of innovations was considered to be having the required **skills and capabilities within the organization**. Novel digital technologies and digital transformation in general presents completely new demands for skills and capabilities in a construction company.

"I believe that there will be a lot of challenges as this [digitalization] is a huge change for traditional operation models. There are completely new requirements for capabilities. This will be easy and exciting for some individuals and almost impossible for others." (H9)

Within Fira, this demand for new skillsets has been approached by both recruiting digital capabilities externally as well as developing them internally. Approximately half of all employees in Fira have a Master's Degree, which is clearly over the industry average. The interviewees also consider that the employees are more open to novel ideas and approaches, including digital initiatives. In addition to recruiting, Fira has also focused on developing digital capabilities internally. For example, more than one interviewee stated that one of the main benefits of the startups and other digital initiatives was that they build the organizational capabilities concerning digital technologies. The startups have created both knowledge on the digital topics, and the ability to describe and solve problems concerning digitalization either internally or in collaboration with other actors.

"A key thing these startups have achieved is that we are developing an ability to discuss IT and digital technologies and collaborate with IT-companies. The startups have created the capability of describing digital problems and solving them." (H11)

None of the interviewees mentioned the issue of **unclear business cases** per se, but the actual managerial tools were discussed in several occasions. It was clear in the interviews that Fira does not require the startups to have a clear business case and does not guide them with direct revenue or profit requirements. Fira encourages the digital initiatives to pursue digital transformation, experiment business models and build organizational capabilities and knowledge. Thus, Fira does not miss on opportunities where the short-term business cases are not clear, as is often the case in transformational digital initiatives.

The third common innovation problem occurring in interviews was **the siloing of business units and lack of collaboration**. Three interviewees considered these kind of mutually beneficial collaborations essential in ensuring the innovativeness of an organization. They all also considered that Fira has a culture that supports this kind of collaboration and a top management that supports collaborative development efforts and decision-making.

"In Fira people innovate outside their personal funnels and the ideas cross-pollinate, which provides an opportunity for a transformative idea to emerge from the sea of initiatives" (H6)

However, even though Fira has been able to establish direct collaborative connections (for example the close collaboration of Flow and SiteDrive) it mostly occurs in situations where the short-term benefit is clear to all participants. Two interviewees mentioned that the organization could offer more opportunities to brainstorm and discuss early-stage ideas and innovations in development cases where the short-term benefits are less clear

Practically all the interviewees considered Fira's culture to be extremely innovative and intrapreneurial and thus the **cultural issues** have not been a major concern in Fira's case. The terms "culture of experimentation" and "culture of trial and error" were used repeatedly, and the digital initiatives and development projects were considered to have a high legacy in the organization. Several interviewees claimed that this strong culture of innovation and challenging the existing structures is the fundamental difference between Fira and the average construction company. It was considered a key strength for the company and more than one interviewees highlighted the innovative culture as one of the key reasons they came into Fira in the first place.

"Fira's unquestionable forte is the unlimited open-mindedness and enthusiasm that is embedded deep in the organization's culture" (H10)

This organizational innovativeness is also supported by the highly intrapreneurial culture within Fira. Several interviewees considered Fira to be highly intrapreneurial, especially in the context of construction industry. Several development projects are developed outside the formal company R&D processes and the initial novel concepts are created informally and without strategic steering. Individuals within the organization facilitate and drive these initiatives, and the initiatives themselves are often highly experimental and explorative in nature.

"If we were to develop everything according to Fira's R&D processes, the digital transformation would be slow and cumbersome. That is not the way to develop these initiatives; we have often gone past all organizational processes and started to solve the issues by ourselves." (H4)

This intrapreneurial activity is also encouraged by the top management. Three interviewees told that the common mindset (and a direct advice from a board member) in Fira is that *"It is easier to ask for forgiveness than for a permission"*. This kind of top management support for intrapreneurial initiatives and fostering of intrapreneurial culture is highly important in order to institutionalize intrapreneurial activity within a company.

In addition to top management support, Fira's company culture also excels in terms of allowing risk taking and tolerating failure in intrapreneurial initiatives. Even though most of the initiatives would not end up being revenue- or profit-generating businesses, they are considered beneficial for the organization nonetheless. Whether it is in terms of added organizational knowledge and capabilities, explored future opportunities or gained network resources, practically all the initiatives are perceived to be beneficial for the company in some specific way.

"Fira has a really strong culture of experimentation and high tolerance for failure. We try out an idea and see if it works out. If not, we will just see what should be done differently and what to do next (...) We may find out that the model we tried

was completely wrong, but what is great is that we have just learned and understood something, and maybe we can do it better the next time." (H4)

Several interviewees considered that the organizational structure of Fira was beneficial for intrapreneurship in terms of lack of rigid hierarchy and efficient execution of ideas. The implementation of ideas is swift, as the intrapreneurs often have the permission to pursue ideas freely and the decision-making is decentralized. However, some interviewees felt that the organizational structure should also include the structures that evaluate, choose and further develop the best ideas and initiatives and reward for them. Thus far, Fira has implemented such a supporting structure to the startups that are evaluated periodically and the management of them is rewarded for success through ownership, but Fira lacks these administrative mechanisms for internal, intrapreneur-driven development projects.

Governance challenges in Fira

The third transformation challenge category, Governance challenges, has been perhaps the most problematic one for Fira's digital transformation. The main governance challenges identified in the digital transformation literature are coordination issues, lack of resources and lack of funding. The lack of resources and lack of funding manifest in Fira very similarly to what the existing literature describes. However, the coordination issues in Fira's case have been more complex and more emphasized than often described in the existing digital transformation literature.

The **coordination issues** can be divided roughly to unclear roles and responsibilities and coordinating between novel digital businesses and traditional construction business. According to one interviewee, the roles and responsibilities have not always been as clear as they could be and there has been no clear champion of digital transformation in the top-management level. The free innovation culture discussed above results in a situation where there is no real coherence in digital

transformation. This is good in terms of exploring as many transformation avenues as possible, but may result in confusion concerning the roles and responsibilities. This ambiguity of roles and responsibilities has decreased recently as Fira has clarified the organizational structure concerning the digital initiatives and named a board member to be in charge of the digital initiatives.

"Our organization is very narrow and everyone sees the subject [of digital transformation] from his own point of view and through his own lens. The differing views and opinions on what is promising bring a lot of fuss and ambiguity to everything we do." (H4)

The other major coordination issue Fira is facing concerns coordination between novel digital businesses and their traditional construction business. This problem arises especially in Fira's relationships with different stakeholders and is intertwined with the issue of a conservative industry that is reluctant to change. As Fira has no construction workers of their own but rely on sub-contractors, the largest coordination difficulty has been in bringing the technologies to the construction sites. Several interviewees also considered that Fira has yet to solve the issue of coordinating internal development efforts between new and traditional businesses outside the applications where there are direct, short-term benefits for all participants.

"The same show goes on in every construction site because the digitalization unfortunately ends at the gates of the construction site." (H11)

" That is a scheduling software where the construction workers sign their tasks, but we have not been able to get them to sign anything, and that is a management issue (...) The guys say that they are using it, but then we can later check ourselves that they haven't even signed in on it for two weeks!" (H11)

In addition to coordination issues, Fira has had some issues concerning the **lack of resources**, especially in terms of time that the employees can allocate to

development projects. Outside the startups, the development work is usually done in addition to the day-to-day work allocated to the intrapreneurial individuals. This works in the early phases of the initiatives, but the further they are developed the more weekly hours the development and implementation requires. In late phases of each initiative, the time and capabilities required often go beyond what an intrapreneurial individual can accomplish in addition to their day-to-day job. Several interviewees pointed out that in these later stages of digital initiatives, there is a need either for additional time allocated to developing the initiatives, for organizational resources such as the aid of professional IT or digital technology personnel.

"When I am doing this in addition to my actual work, the progress is not as fast and agile as it should be. I cannot and perhaps even should not use my whole capacity for it, as at this stage it should probably be developed by someone else. (...) At the moment I think this for maybe an hour a week, when three people should be brainstorming it full-time." (H5)

The issue of **lack of funding** the digital initiatives, especially startups, was discussed in the interviews, but the interviewees did not consider it to be as large an issue at the moment as the access to other supplementary resources. This may be due to the fact that the early stage exploratory digital initiatives are not especially dependent on funding, but rather require other support concerning IT-infrastructure, time allocated for development work etc. In addition, Fira provides the startups with a funding that the interviewees considered sufficient.

Digital transformation process in Fira

The digital transformation process of Fira is still very much a transformation process in progress, but at the moment the process can be broken down to three different phases. Each of the phases has different characteristics in terms of goals and challenges, and each of them has to be managed accordingly. Even though the

process can be discussed through different phases, the case of Fira shows clearly that they were by no means initially planned or formulated before the transformation process. Even though it is possible to evaluate the process and the tracks of how digital transformation has been implemented in Fira, claiming that the process was predetermined in any way would be simplifying the transformation process to a fault. It is clear that while the top management of Fira acknowledged the importance of digital transformation and formulated the according vision, the roadmap to realizing the vision emerged (and is still emerging) as the transformation process proceeds.

However, Fira's digital transformation process has shaped to be a rather promising one, and as such offers a framework of one potential roadmap for digital transformation. The process can be divided into three phases in the context of Fira: i) creating a digital vision and exploring the opportunities of digital transformation, ii) gathering and integrating digital knowledge and capabilities and iii) creating the digital platforms and facilitating the network business.

Figure 7: The three identified phases of a digital transformation process

The phases themselves present a good view on the highly emergent nature of the digital transformation process. The complete digital transformation process is not planned and implemented beforehand, but it rather develops as the process matures. In the first phase the vision directs the explorative initiatives, but at the same those initiatives create organizational understanding that refines and redirects the vision, which again redirects the following digital initiatives. In the second phase, integrating digital knowledge creates new capability requirements, whereas the added digital capabilities offer new opportunities for data gathering, integration and utilization. Similarly, the last phase aims to provide platforms for digital

communities and networks and facilitate the interactions in those platforms, but at the same time, those communities constantly steer the development of new platforms, which again provides an opportunity for new communities and networks to emerge.

The phases themselves are highly iterative and in no way predetermined or linear, and are not to be interpreted as such. Even though certain managerial tools are emphasized in early stages of the transformation, their significance is not to be forgotten in later stages. In addition, the third phase is not an "end state" nor is the transformation finished at that point, as the digital environment is constantly changing and constant innovation and transformation is required even after the initial transformation process. For example, creating a transformative vision is a managerial tool of high relevance in the initial stages of digital transformation and presented as such, but this is not to be interpreted so that the vision would not have significance in later stages.

However, presenting the transformation as a process offers a good insight on the emergence of challenges and the potential managerial tools there are. Some challenges need not be concerned early in the transformation and some managerial actions need to be made before the process can proceed (e.g. the organization has to be able to acquire necessary skills and capabilities before committing heavily to new business initiatives).

This thesis executes the process view of Fira's digital transformation by systematically analyzing the interview materials from the interviews, and the material behind the process illustration is completely empirical. The first phase emphasizes the challenges and the according managerial tools from the early interviews, focusing especially on the actions that Fira took in the early phases of their "building movement" –strategy that began in 2015.

The second phase focuses on what the interviewees considered to be the core challenges and the according managerial tools at the moment. Fira has recently evaluated the initial startups presented earlier in this thesis, and only SiteDrive continues in a startup format. Now Fira focuses on refining the knowledge and capabilities acquired in the first phase and integrating this digital knowledge to its construction processes. This presents new challenges and thus the managerial tools in this phase are different. The focal source of these tools is what the interviewees considered as the most important ones in this phase of knowledge gathering, refinement and integration.

Fira has yet to enter the third phase of the transformation, and thus challenges and managerial tools for the third phase are partially predictive in nature. This phase combines the interview material on what needs to be achieved in order to realize the vision of scalable digital platforms to what the interviewees considered to be the future challenges and their solutions in the digital transformation of the industry. The following table 8 gathers the managerial tools discussed in the interviews and allocates these tools to the transformation phases where they are either utilized in Fira or where the interviewees felt that they should be utilized.

Table 8: Transformation phases in Fira and the according managerial tools

	Creating a digital vision and exploring opportunities of digital transformation	Gathering and integrating digital knowledge & capabilities	Creating digital platforms and facilitiating networks
Transformation challenges	- Creating a transformative vision - Communicating the vision internally and externally - Narrating the industrial transformation	- Refining the organizational vision - Narrating industrial transformation	- Incentivizing stakeholders to participate in disruptive business models
Innovation challenges	- Fostering intrapreneurial culture - Developing skills and capabilities internally - Recruiting skills and capabilites externally - Allowing risk-taking and tolerating failure - Allowing initiatives with unclear business cases	- Fostering intrapreneurial culture - Fostering collaboration & preventing siloing - Developing skills and capabilities internally - Recruiting skills and capabilites externally - Systematically evaluating and supporting digital initiatives	- Fostering collaboration & preventing siloing - Rewarding for successful initiatives - Systematically evaluating and supporting digital initiatives
Governance challenges	- Providing resources for digital initiatives	- Coordinating roles and responsibilites - Providing resources for digital initiatives	- Coordinating roles and responsibilities - Providing resources for digital initiatives - Providing funding for digital initiatives - Coordinating between novel and traditional businesses

Creating a digital vision and exploring digital opportunities

As the table 8 shows, the challenges in the first phase of digital transformative focus strongly on transformation challenges and innovation challenges, and thus the managerial tools are also chosen accordingly. The initial steps focus strongly on overcoming the transformation challenges of lack of vision, lack of impetus and the conservative industry, and thus the managerial tools revolve around creating and communicating a transformative vision and narrating the industry transformation as a whole. The rest of the challenges are mainly innovation challenges, and thus the managerial tools focus on creating a wide range of explorative digital initiatives and developing the organizational capabilities concerning digital technologies. In the early stages, the governance of the explorative digital initiatives is rather light and thus the governance challenges or the according managerial tools do not have a focal role in the first phase of the digital transformation.

The digital transformation process in Fira started by formulating and communicating a top management-led vision concerning digital transformation. This vision is interestingly two-fold. The vision of "building smarter society" created clear organizational impetus for change and together with the goal to increase the valuation to 1000M€ presented a wide frame for the future of Fira as an organization. At the same time the "hourglass model" was created as the guideline for digital initiatives and a clear and easily understandable illustration of Fira's digital vision. The interviewees described the content, role and significance of both of these visions very similarly and coherently. Fira's top management has clearly succeeded in designing and communicating a catching vision to facilitate the digital transformation and create organizational impetus for change.

Another early managerial action Fira's management initiated in a very early phase of the transformation is narrating the digital transformation of construction industry to external stakeholders. The aim was to create external impetus for institutional

change, find collaborators in developing and implementing digital initiatives and generally breaking the stagnant status quo of the conservative construction industry.

"We want to narrate the story of digital transformation and that is why we have started to consistently narrate what we call building movement. In 2016 we started to systematically tell this story." (H1)

Another early strategy applied in Fira was launching several highly explorative digital initiatives. The startups were chosen by the existing management in charge of digital transformation, but the initiatives themselves were not top management-led. There were no requirements for revenue or profit, or that they would have to complement the existing business in any way. What the top management rather emphasized was innovativeness, novelty and potential, and for example, the only requirement for the initial startups was that they would fit somehow the digital vision of Fira, namely the hourglass model. In addition, in order to ensure that the traditional business would not dictate the avenues the digital initiatives would explore, Fira created the Digital Business unit and transferred the digital development under it.

These individual initiatives launched in the first phase of transformation process could not per se transform an entire industry, but they had a large role in creating digital capabilities and knowledge within the organization and providing knowledge on the necessary resources to pursue disruption of the industry. In addition, they refined Fira's digital vision and presented future development streams for digital innovating. However, it soon came clear that the transformation of value creation from pipeline to platform and the according business model transformation in Fira let alone in an entire industry required a wider technology and paradigm shift.

"We are creating mechanisms for Fira to learn from others as fast as possible and implement what we have learned. Our startup-program allows us to practice how

this kind of venture program really means for the organization, and we have learned incredibly much in a short period. Now it might be time to take this [digital initiatives] to the next level." (H4)

Fira's case demonstrates a good approach to the transformation challenges that several interviewees considered to be most common ones in the initial phase of digital transformation. The transformation challenges in the first phase concern the two first categories identified in the literature: transformation challenges and innovation challenges. The successful initiation of digital transformation requires a coherent and comprehensive organizational vision and sufficient impetus, along with a sufficient amount of high-quality digital innovations and initiatives.

Gathering and integrating digital knowledge and capabilities

The second phase of digital transformation in table 8 presents a transition in focal managerial tools utilized. The role of transformation challenges decreases and thus the role of the according managerial tools decreases. In addition, the managerial tools utilized to overcome innovation challenges shift from ensuring a wide range of digital initiatives to digitizing the manufacturing processes and fostering an intrapreneurial environment with regard to gathering and utilizing the increasing digital knowledge. This is especially visible regarding the facilitation of collaborative innovation and the processes of creating, gathering and utilizing relevant data and knowledge from different sources and on different organizational levels. The second phase also presents an increase of importance of managerial tools regarding the governance challenges, as the collaborative efforts to gather and utilize digital knowledge increase the importance of coordination, especially in terms of the clarity of roles and responsibilities.

In Fira's case, although several of the initiatives did not end up being revenue generators, they provided the organization with skilled workforce and knowledge on the next development steps, networks of stakeholders and the required actions

to take. The phase that Fira is currently in is refining this acquired knowledge by creating data acquisition policies and implementing these policies to the construction site level. Based on the knowledge and skills derived from the digital initiatives, it was concluded that the first step in transforming the business models of the industry was to transform the currently project-based business to process-based, as there are no real platform opportunities in the current project-based formation of the industry. Before implementing any viable digital platforms, Fira has to be able to systematically identify, collect and process the relevant data in order to first create a construction process that is managed data-intensively.

"If we cannot tell the exact resource demand for subcontractors and suppliers, i.e. practically schedule and manage the projects with the relevant and accurate data so that the projects are efficient and on time, we end up in a circle of just finding cheaper and cheaper resources. Then the business model dictates us and not the other way around" (H11)

The first step of creating a process paradigm in construction industry is digitizing the processes of a construction project. All actions on the construction site create data, and that data has to be actively used in managing the construction process. In Fira's view, the four fundaments in digitizing the construction process included the real-time information on the planning/work order, scheduling, degree of readiness and quality and logistics. Only when this information is digital and available to all the relevant stakeholders, can the construction sites be managed as processes, increasing the efficiency of both individual construction projects as well as the resources used.

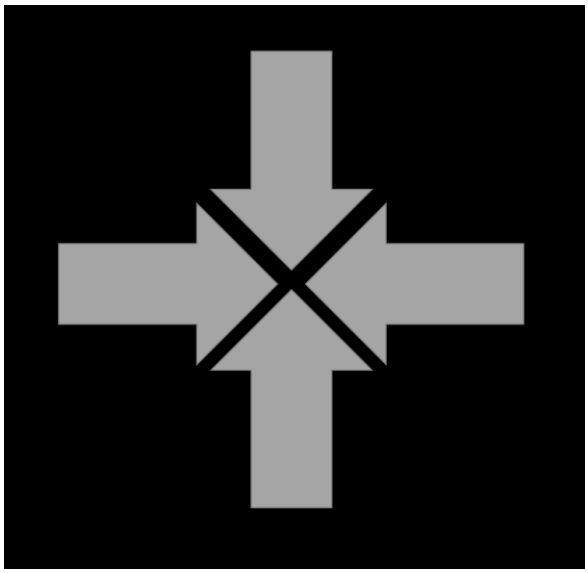

Figure 8: The four aspects of digitizing the construction process

The key challenges Fira has faced in the second phase mostly revolve around implementation of data gathering and utilization. The institutional environment Fira is operating in is conservative and even though Fira does not lack impetus, their sub-contractors operating in the construction sites often do. In addition, they may lack the motivation to participate to the industry transformation as they benefit from the current power structures. Fira has to be able to motivate the construction site personnel, as they are the eventual users of the digital planning and scheduling data, and more importantly, they are the source of the process-specific data concerning the degree and readiness and quality of the construction tasks. Only through this acquisition and integration of digital information can Fira proceed the transformation process towards the real-time knowledge-managed construction sites.

The second phase of digital transformation has also highlighted the importance of the ability to refine and develop the initial digital vision. Fira's initial strategy was to keep the traditional pipeline-based construction business and the new digital businesses apart aside from some junction points, as they were considered too fundamentally different. However, this vision has later refined to an understanding

that the digital platforms can rarely be implemented as such to a non-digital environment. The traditional construction business and the digital initiatives need to be developed simultaneously in order for either to utilize new digital technologies.

"It is only logical that we have to first digitize the construction process and the traditional pipeline-business model. When all that is managed digitally, when can start to consider if there would be potential digital platform opportunities to pursue." (H11)

Creating digital platforms and facilitating networks

The third phase of digital transformation process presents a shift towards the governance challenges and thus also the utilized managerial tools change. As the company aims to launch industry-wide disruptive digital platforms, the role of the governance increases considerably. The coordination issues in terms of traditional and novel businesses as well as the coordination of roles and responsibilities within the organization become of major importance. In addition, the digital initiatives are not as explorative by nature and thus require more in terms of resources and funding. The transformation and innovation challenges focus more and more on the collaborative innovation efforts both internally and in collaboration with external stakeholders.

The third phase of Fira's digital transformation concerns the actual disruption of the institutional value creation and business models by replacing the existing value chains with digitally enabled platforms. In order to facilitate the network interactions and the value-creating transactions in these platforms, the core processes usually need to be digitalized, which is surprisingly often overlooked in digital transformation literature.

Before implementing platform-based business models, Fira has to be able to divide the construction processes (managed with digital knowledge) into individual

subtasks and create a platform that manages these subtasks efficiently. After breaking the processes into individual tasks and establishing real-time digital governance of the process, Fira can create platforms that facilitate the executing communities (and eventually housing communities) central for Fira's digital vision.

The focal challenges concerning the third phase of digital transformation are likely to be the governance challenges identified by digital transformation literature but not yet fully faced by Fira. For example, the governance of individual digital initiatives becomes more challenging as the experimental and explorative initiatives similar to the ones in the early stages are no longer sufficient. One interviewee pointed out that in the later stages of creating industry-transformative digital platforms, the platforms need to be implemented as industry-wide solutions, which may be resource-intensive from the get-go.

The governance challenges in later stages do not consider only the coordination and resourcing individual initiatives, but also the coordination between the traditional construction business and the novel digital business. Two interviewees felt that this latest phase of digital transformation might be especially difficult in terms of coordinating the relationship of traditional construction business and the novel digital platforms that essentially aim to disrupt the value chains utilized by traditional business.

"We do take seriously the possibility that eventually we may disrupt ourselves (...) We have to dare to think that if it is going to happen, it is better that we do it by ourselves." (H1)

The three phases of digital transformation and the focal managerial tools can be presented as a traditional process model, bearing in mind the emergent and iterative nature of the transformation process. The following figure 8 illustrates the process view of digital transformation and provides a summary of the focal managerial tools in each phase of the transformation.

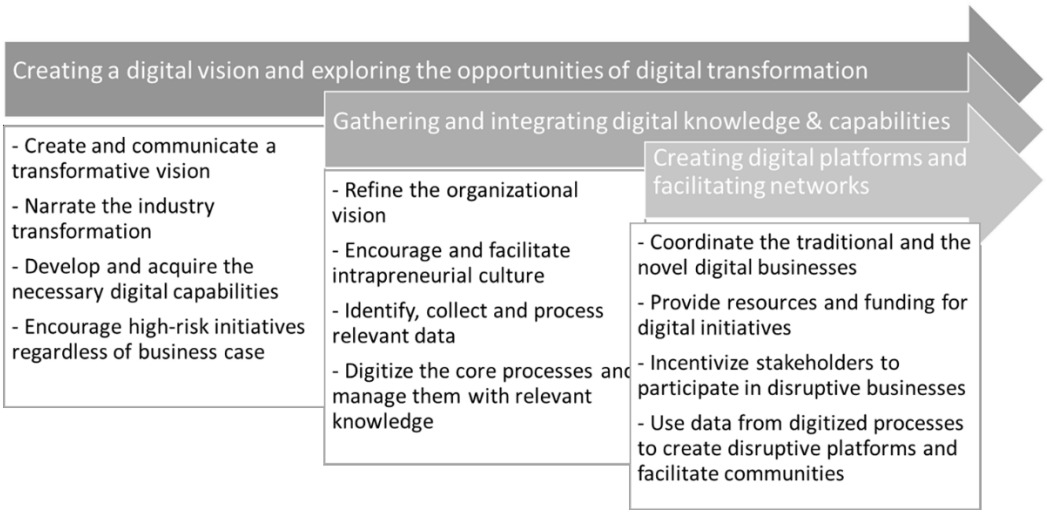

Figure 9: Process view of the digital transformation implementation

Discussion and Conclusions

The concept of digital transformation is gaining relevance in all industries, including the more traditional manufacturing industries that have relied on traditional value creation and value capture models. Novel digital technologies transform complete ecosystems and force existing actors to cope with this change. Entering the digital era of business forces traditional organizations to strategize in a constantly digitizing environment and to focus on new kind of organizational resources and capabilities in terms of strategizing and innovating.

In order to understand the phenomenon of digital transformation in traditional industries as well as facilitating the transformation process itself, the main research question of *"How can organizations in traditional industries create and implement digital strategies supporting digital transformation?"* was formulated. To answer this question comprehensively, two supporting research questions were utilized.

RQ1: What kind of challenges does digital transformation impose on strategizing in the construction industry?

The first supporting research question was answered by developing a new literature-based categorization for digital transformation challenges and evaluating the manifestation of those challenges in a traditional industry setting through an empirical research. As a result, the thesis proposes a three-layered categorization for digital transformation challenges. These categories are i) transformation challenges focusing on creating direction and impetus for change both internally and externally, ii) innovation challenges focusing on ensuring the quality and quantity of transformative innovations and iii) governance challenges focusing on governance, funding and supporting of digital initiatives. In addition, the thesis identifies and evaluates managerial tools that are utilized in order to overcome each of these challenges.

The comparison of management literature and the empirical evidence showcased that in the case of Fira, there is a difference in which challenges are emphasized. The management literature focuses on internal challenges such as organizational vision, internal capabilities and quality and quantity of innovations, while the case demonstrated that the most difficult aspects of digital transformation often concern the external environment. The reason may be that the case company Fira is trying to create and drive digital transformation in the industry rather than just coping with the changing industrial environment. However, the challenges concerning facilitating digital transformation in a stagnant environment are often overlooked in the management literature and present a potential future research stream.

In general, Fira has succeeded well in the initial steps of digital transformation. They have excelled at creating a transformative digital vision and communicating that vision internally and externally. They have also managed to create organization-wide impetus for change and commitment for digital transformation among most employees. The initial exploration of potential future avenues through both startups and internal development projects can be considered rather successful. These successes are mainly considered to be a result of a dedicated and skilled workforce and the strong, open internal culture of experimentation and constant development. The organization has experience on strategic transformation and the culture supports and highlights the capability for disruptive transformation.

The largest difficulties thus far in the context of Fira have revolved around driving the institutional change of digital transformation, gathering and utilizing digital data and knowledge and developing the concrete, disruptive platform business models for construction industry. These core challenges are linked, as the traditional and stagnant industry with closed and fragmented data sources and the difficulties in implementing changes in the supply chain complicate gathering and utilizing real-time data and knowledge, which again is vital in creating digital platforms that

create value through facilitating interactions such as real-time transactions based on for example real-time location or work phase knowledge.

In conclusion, in addition to discount the importance of external institutional environment, the digital transformation literature concentrates on the environment and culture supporting transformative individual digital initiatives, while somewhat neglecting developing and digitizing systematically the core processes of the traditional business. The empirical evidence in the case of Fira suggests that it is often vital to digitize the complete manufacturing process and then collect and integrate the data it contributes. Even though this digitizing of process is initially incremental rather than transformative, it constructs the foundation on which the innovators can create transformational businesses based on digital platforms.

RQ2: How can a construction company efficiently organize, support and enable digital transformation process?

The second supporting research question considered organizing and supporting the digital transformation process. In order to answer this, the thesis illustrates the transformation process Fira has taken this far and describes the key strategic and managerial actions taken in each phase of the transformation. The phases identified in the digital transformation process are **i) creating a digital vision and exploring the opportunities of digital transformation**, **ii) gathering and integrating digital knowledge and capabilities** and **iii) creating the digital platforms and facilitating the network business**. The empirical evidence shows that even though the transformation is emergent and iterative rather than pre-planned and linear, the emerging core challenges are different in each stage of the transformation process. The early phase of transformation process highlights the importance of overcoming transformative challenges, whereas the governance challenges are of minor importance. As the transformation process proceeds, the governance challenges such as coordinating the collaboration between traditional and new businesses

become of higher and higher importance, whereas the initial challenges become less and less pressing.

The innovation challenges remain important throughout the transformation, but the emphasis within the challenge category shifts. The managerial tools in initial stages of digital transformation focus on fostering the intrapreneurial culture and ensuring the high quality, quantity and divergence of the explorative digital initiatives. In the later stages the importance is shifted to supporting the collaborative organizational efforts in order to create digital initiatives and startups that are closer to the core of the emerging digital strategy and that have the real potential to become industry-disrupting platforms. Innovation challenges in the late stages of the development also focus heavily on structuring the organization to suit the needs of these initiatives and to support these industry-wide development projects with sufficient organizational resources.

Theoretical contributions

The core theoretical contributions of this thesis focus on the novel process model of digital transformation. The thesis sheds light on the phenomenon of digital transformation and further develops the existing literature by complementing the digital transformation literature with intrapreneurship literature and then utilizing empirical evidence. The empirical evidence is used to recognize different phases within the digital transformation process and the core challenges and relevant managerial tools in each of those phases. The intrapreneurship literature complements the digital strategy literature for example by presenting a comprehensive managerial toolset that inherently focuses on the focal point of innovation challenges: ensuring the quality and quantity of innovations. The more specific contributions of the developed digital transformation process model can be broken down into three distinct elements.

First, the thesis strengthens the understanding on digital transformation process as an emergent, iterative and organization-wide phenomenon. The empirical evidence of the thesis highlights the view that digital transformation is not a deterministic, carefully pre-planned project but it is rather highly emergent and iterative in nature. The process is driven by a continuum of managerial decisions and evolving organizational understanding, where the digital strategy evolves constantly and is executed as a strategy-as-a-practice. The empirical evidence suggests that a wide range of organizational actors can be considered as strategic actors and the digital strategy develops incrementally through their actions, rather than the digital strategy being a rigid set of actions dictated by the top management in advance. As a result, the digital transformation and the digital strategy aiming to drive and utilize this transformation are highly non-linear and emergent by nature. The thesis also highlights the organization-wide nature of digital transformation for example by presenting empirical evidence that the existing traditional business offers a solid foundation, knowledge source and application environment for the novel digital initiatives.

The second theoretical contribution is that the thesis synthesizes and develops a novel process model of digital development in the context of a "traditional" industry with primarily physical end products. Even though the digital transformation literature considers digital transformation challenges and the digital transformation itself rather extensively, the challenge framework and the transformation process presented in this thesis have novelty in systematically categorizing transformation challenges and applying the categorization and a novel process view in a traditional industry context. Thus, this develops insight in a traditional, stagnant industry context such as the construction industry, as the digital transformation literature often focuses on industries with digital products. The digital transformation process in an industry with primarily physical products is likely to have individual characteristics. The importance to conduct research in such a setting is clear in for example pointing out the importance of digitizing the core manufacturing processes

in order to gather, integrate and utilize the relevant digital knowledge rather than aiming to build the digital business model from scratch.

The third contribution relates to the importance of external institutional rigidity and resistance to change as a major transformation challenge. Whereas the existing literature focuses strongly on internal challenges, the empirical evidence of this study shows that the external, environmental challenges are of similar importance. There are managerial tools to drive change in the institutional environment, such as publicly narrating the industry transformation, clearly communicating the digital vision and participating in industry-wide collaborative development projects. However, the external challenges may be more difficult to overcome than the internal challenges, as the managerial tools are scarcer and the institutional environment is more resistant to change than the internal organizational environment.

Managerial implications

This thesis offers several implications for managers in companies pursuing digital transformation and strategizing in digitizing business environments. An evaluation of current and upcoming digital transformation challenges should be conducted in different phases of the digital transformation. Mapping internal and external challenges to the presented categories of transformative, innovation and governance challenges offers a systematic way to evaluate the focal challenges the organization is facing. Additionally, the thesis presents a comprehensive set of managerial tools to overcome each distinct challenge. These individual challenges and the according managerial tools need to be considered as they emerge, and the described frameworks present a relevant managerial tool for this consideration.

However, when creating, developing and implementing a comprehensive digital strategy, each phase presents a wider strategic with relevant managerial implications. The literature shows that in the first phase of the transformation,

companies usually invest in digital technologies and digital infrastructures and fail to see beyond the technology itself. This results in an incremental development rather than fundamental business transformation utilizing digitalization to its full potential, which can be argued to be the very core of the first category of digital transformation challenges.

This challenge can be answered by adopting a strategic management philosophy, in which digital strategy is approached not as a top-down plan but as an organization-wide task of creating prerequisites for digital transformation. Rather than the exact solutions, the focus should be on developing the dynamic capabilities and culture that enable the recognition and solving of emerging challenges as the transformation process proceeds. This manifests in the managerial tools most relevant in the first transformation phase. Instead of implementing individual technologies or investing in specific development areas, the early focus should be heavily on creating and communicating the digital vision and allowing the employees to pursue this vision rather freely by for example allowing and encouraging high-risk digital initiatives, regardless of their short-term business case.

As the transformation process proceeds, the challenges (and according managerial tools) shift from the exploration of new opportunities and capability development towards the integration of digital knowledge. The core challenge in the second phase is thus the integration of data, knowledge and capabilities into developing solid foundations for future digital initiatives, whether they are platform-based new businesses or incremental digital process development projects.

Here the core managerial actions should concern ensuring that the digital initiatives and development efforts penetrate the whole organization. The agendas and efforts of different managers and business units do not always have to be completely aligned, but coordination is important in order to achieve efficiency in development initiatives and in order to avoid direct conflicts. The empirical evidence shows that

this is especially important in coordinating the approach and development efforts of traditional and novel businesses. A good example is the construction industry, where the companies need to be able to digitize the core processes of the traditional construction process before the development of digital businesses, as they often require real-time location, production phase, scheduling, logistics etc. data. As the digital transformation process view demonstrates, the managerial focus in the middle phase of the transformation should shift heavily towards data collection and integration, process digitization and cross-unit collaboration.

Similarly, as the transformation process matures to the third stage, the focal managerial issues shift towards governance issues related to resource management and the creation of actual transformative platform. Here the core challenge is simply the creation and launch of novel, disruptive digital business platforms. In the last phase the key managerial considerations should focus on recognizing and resourcing the platforms that have a potential to utilize and monetize the integrated data to the maximum. Another top management consideration in the late stage of the transformation process is incentivizing relevant stakeholders to participate in these disruptive platforms. The managerial considerations concerning digital initiatives in the later stages differs from those in the early phase. Instead of ensuring the innovativeness and explorative nature, the top considerations have to focus on the business case of the platforms, the business and monetization model, relevant stakeholder groups and coordination between business units. This phase highlights the governance challenges and the according managerial tools as described in the findings section.

Research limitations

The core limitations of this thesis concern the qualitative single-case study being the research method. The qualitative single-case study as the chosen research method works both in favor and against the objective of this thesis. It is often the best method in order to explore a new phenomenon and understand it as well as

possible in a specific context. However, the two main limitations of such a study are the generalizability and reliability of the results (Dubois & Gadde, 2002).

The first limitation of this thesis is the generalizability of the achieved results. The research on digital transformation challenges and process is conducted in the context of the case company and the case industry. Fira as a company and construction industry as the business environment do not represent other companies and industrial environments, and thus the results should not be applied as such to other contexts. However, the thesis offer a highly descriptive illustration of one digital transformation process, and its insights should not be overlooked. In addition, Fira is clearly a forerunner in its industry, and thus offers a relevant source of knowledge in general development of digital strategy.

Fira's transformation process is by no means been deterministic or strictly planning-driven, and it is only a description of one digital transformation (additionally, a transformation process that is still a transformation-in-progress). Still, this description of Fira's transformation process and the varying managerial tools utilized in different stages of the transformation is one of the first systematic transformation process descriptions focusing on a traditional industry setting. As such, it offers a good insight on digital transformation process and the digital strategizing, especially in a traditional and primarily physical industry setting. Thus, the results may be well utilized in industries with similar characteristics. The results on common manifestation of digital transformation challenges and digital transformation process might be relevant for example for corporations operating in industrial manufacturing workshop industry and aiming to utilize novel digital technologies in digital-driven performance improvement, digital service creation or novel business model creation. In order to achieve more generalizable results and a deeper understanding on how digital transformation process manifests in different industry contexts, I suggest applying a similar empirical research on digital transformation in varying organizations and business environments.

The other core limitation of this thesis concerns the reliability of the results. The main data collection method was face-to-face interviews, where the interviewer has a lot of power in steering the conversation and finding the answers he either expects or initially looks for. This is especially true in this kind of study where the interviews are structured as open conversations rather than rigidly structures questionnaires. The chosen data collection method limits the reliability, as it highlight the role of the interviewer in presenting possibly leading questions. Although, it can also be argued that these open discussions lead to the largest amount of individual insights from interviewees and thus most explorative results, as the conversations do not follow a pre-planned structure.

The reliability of the research is also limited by the possibly skewed qualitative interpretation of the data. An individual researcher can have biases in interpreting the qualitative interview data. This is especially threatening if only one researcher collects and interprets the data. This thesis aimed to overcome both of these reliability issues by having two researchers in the interview sessions. In addition, when interpreting the data and conducting the analysis, we arranged regular meetings where the progress of the thesis and especially the analysis and interpretation of the results were discussed. Although it does not completely eliminate the reliability issues, discussing the analysis and the interpretations aids in avoiding strong individual biases in the analysis phase. It can also be argued that such a qualitative single-case study aims to explore the phenomenon, to highlight the different insights of interviewees and to interpret these insights rather than to generate objective, undeniable facts as conclusions.

Avenues for future research

Researching digital strategy as a strategy-as-a-practice.

The digital strategy literature highlights the role of the top-management in formulating and implementing a digital strategy. The empirical evidence however

suggests that there are several strategic actors outside the top management and their role in creating and especially implementing a digital strategy should not be neglected. Especially the role of middle management in digital transformation process and the digital strategy work provides an interesting potential research stream. Applying for example the extensive strategy-as-a-practice research (e.g. Jarzabkowski, 2004; Vaara & Whittington, 2012; Whittington, 2006) in the context of digital strategizing would be an interesting foundation for future research.

Monetary implications of implementing a digital strategy

Similarly to most of current digital strategy literature, this thesis focuses on the facilitation of transformation process itself. After exploring the characteristics of the transformation process itself, the actual monetary implications of facilitating digital transformation is the next logical step. What are the monetary benefits of being the instigator of digital transformation (such as Fira) versus the benefits of being a first-follower or even later adopter? Is it important to launch digital applications as soon as possible? Does proprietary technological leadership or the positioning in the value creation network achieve sustainable competitive advantages and higher monetary benefits? These considerations together with the closer description of the final phase of the digital transformation process in general would complement this research greatly.

Systematic designing of digital strategy

This thesis emphasizes the digital transformation process as an emergent process. In addition, it focuses on transformation challenges in different phases of the process and the according managerial tools. Further research could focus on studying the facilitation of digital transformation in several contexts and organizations (in succeeded as well as failed transformations) and consider if there are constant, generalizable best practices for example in different phases of digital transformation or in certain industry contexts. Optimally, this research would be

conducted as a research that follows and evaluates a complete transformation process, focusing real-time on the emerging challenges and the tools utilized in different situations.

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Appendix I: Examples of interview questionnaire

Finnish interview questionnaire (original)

1. **Tausta**

   Mikä on haastateltavan oma tausta? Miten päädyit Firalle? Mitä teet Firalla? Mitä erityistä Firassa on tätä taustaa vasten, miksi Fira?

2. **Digitalisaation rooli ja merkitys**

   Millaisena näet digitalisaation roolin rakennusalalla? Mitkä ovat Firan tavoitteet digitalisaation suhteen? Kääntäen: Miten digitalisaatio toteuttaa Firan laajempia strategiaa ja arvoja?

   Tämän hetken keskeisimmät kehityssuunnat (digitalisaatioon liittyen)? Mikä on kehityksen painopiste tällä hetkellä?

   Havaitsetko organisaatiossa erilaisia tulkintoja ja ajatuksi suhteessa Firan strategisiin päämääriin? Nähdäänkö digitalisaatio mielestäsi eri tavoin eri yksiköissä ja niiden toiminnassa?

3. **Firan transformaatioprosessi ja digitaalinen strategia**

   Millainen on digitaalisen kehityksen kokonaiskuva Firassa? Onko esimerkiksi teemoja jotka läpileikkaavat eri startupeja ja muita digitaalisia aloitteita? Mikä on niiden yhteinen kehityssuunta?

   Millaisena näet Firan tämänhetkisen digitaalisen strategian?

   - Miten luotu ja miten johdettu? Millaiset vastuualueet?
   - Vision rooli?
   - Digitaalinen liiketoiminta on eriytetty omaksi yksikökseen, miksi? Mikä on sen suhde perinteiseen liiketoimintaan? Onko yksiköiden välillä yhteistyötä?

- Start-upien rooli? Ajetaanko jatkossa aloitteita start-upien vai sisäisten kehitysprojektien kautta? Miksi
- Miten organisaatiossa varsinainen innovaatiotyö tapahtuu? Miten aloitteet syntyvät ja miten niitä viedään eteenpäin? Miten organisaatio tukee innovaatiotyötä?
- Miten mittaatte ja arvioitte digitaalisen liiketoiminnan kehittymistä ja onnistumista? Onko olemassa tiettyjä konkreettisia lyhyen tai pitkän aikavälin tavoitteita?

4. **Digitaalisen transformaation haasteet**

   Millaisia haasteita digitaalisessa transformaatiossa ja digistrategian jalkauttamisessa on kohdattu?

   - Transformatiiviset haasteet?
   - Innovaatiohaasteet?
   - Hallinnon haasteet?

   Millaiset em. haasteista ovat olleet suurimpia, miten Fira on pyrkinyt reagoimaan niihin?

English interview questionnaire (translated)

1. **Background**

   What is the background of the interviewee? How did you end up in Fira? What do you do in Fira? What are the specific traits in Fira and why Fira?

2. **The role and significance of digitalization**

   How do you see digitalization in the construction industry? What are Fira's goals concerning digitalization? Conversely: How does digitalization fulfill Fira's wider strategy and values?

   Current top priority development trends (concerning digitalization)? What is the focus of development at the moment?

Do you see differing interpretations concerning Fira's strategic goals? Is digitalization seen differently in different units?

3. **Fira's transformation process and digital strategy**

   What nis the big picture of digital development in Fira? Are there for example themes that cut across different startups and digital initiatives? What is the common direction of their development?

   How do you perceive Fira's current digital strategy?

   - How is it created and managed? What are the different responsibilities like?
   - What is the role of the vision?
   - The digital business is separated to its individual unit, why? What is its relationship with traditional business? Is there cooperation between the units?
   - The role of the startups? Are digital initiatives pursued through startups or internal development projects in the future? Why?
   - How is the actual innovating organized in Fira? How are the initiatives created and pursued? How does the organization support innovating?
   - How do you measure and evaluate the development and success of digital business? Are there any concrete short or long term goals and objectives?

4. **The challenges of digital transformation**

   What kind of challenges have there been in digital transformation and implementing the digital strategy?

   - Transformative challenges?
   - Innovation challenges?
   - Governance challenges?

   What have been the largest challenges and how has Fira reacted to them?